

THE ENCYCLOPEDIA AMERICANA

Editor in Chief

Frederick Converse Beach

Editor of The Scientific American

Managing Editor

George Edwin Rines



SIXTEEN
VOLUMES

ILLUSTRATED

Associate and Advisory Editors

Simon Newcomb, Ph.D., LL.D., D.Sc.

James E. Creighton, A.B., Ph.D.

Robert S. Woodward, C.E., Ph.D.

David Starr Jordan, Ph.D., LL.D.

Russell Sturgis, A.M., Ph.D., F.A.I.A.

Edward Everett Hale, S.T.D., LL.D.

Andrew C. McLaughlin, A.M.

Sylvester Burnham, D.D.

James H. Kirkland, Ph.D., LL.D.

Smith Ely Jelliffe, A.M., Ph.D., M.D.

Allan Douglas Risteen, Ph.D.

John J. Wynne, S.J.

George Letchworth English, A.A.A.S.

For Canada

George McKimmon Wrong, M.A.

Charles W. Colby, M.A., Ph.D.

THE AMERICANA COMPANY

258 FIFTH AVENUE, NEW YORK

COPYRIGHT, 1903

BY

FREDERICK CONVERSE BEACH

SPECIAL NOTICE.—The signed articles in this Encyclopedia have been written especially for this work, and are fully protected by copyright as published. The unsigned articles have also been originally prepared by the various department experts, and are fully protected by copyright as issued. All rights are reserved, and privilege of publication of any portion of the Encyclopedia Americana is expressly reserved by the publishers.



A FEW OF THE

LEADING ARTICLES

IN VOLUME TWO

Written and Signed by Specialists



ART	CHARLES H. MILLER, N.A. Municipal Art Society, New York
ART EDUCATION	ISAAC EDWARDS CLARKE Bureau of Education, Washington, D. C.
ARTHROPODA	A. S. PACKARD Of Brown University
ASSOCIATION OF IDEAS	I. M. BENTLEY Assistant Professor of Psychology, Cornell University
ASTRO-PHOTOGRAPHY	F. S. LUTHER Of Trinity College
ASTRONOMY; ASTRONOMY, HISTORY OF; ASTRONOMY, PRACTICAL; ASTRONOMY, THEORETICAL	SIMON NEWCOMB, LL.D. Astronomer and Scientist
AUGUSTINIANISM	JOHN GRIER HIBBEN Professor of Philosophy, Princeton University
AUGUSTINIANS	THOMAS C. MIDDLETON, O.S.A.
AUTOMOBILE	MARIUS C. KRARUP Formerly Editor of 'The Automobile'
BACTERIA AND BACTERIOLOGY	A. C. ABBOTT Bacteriologist, University of Pennsylvania
BALTIMORE, Md.	WILLIAM F. WHEATLEY
BAND SAW BLADES.	EDWARD C. MERSHON Of W. B. Mershon & Co., Saginaw, Mich.
BANKS AND BANKING	O. P. AUSTIN United States Treasury Department
BANKS AND BANKING, AMERICAN	LEVI PARSONS MORTON
BANQUETS	MILES BRADFORD Author of 'Carlotta and I'
BAPTISTS IN AMERICA	HENRY CLAY VEDDER Crozer Theological Seminary
BARBADOES	MARRION WILCOX Authority on Latin-America
BATH, HISTORY OF THE	JOHN R. MEADER Editor American Year Book
BEARINGS, ANTI-FRICTION	HENRY SOUTHERN Engineer of the American Compound Bearing Co.
BEE KEEPING	E. R. ROOT Author of 'A. B. C. of Bee Culture' and Editor of 'Gleanings in Bee Culture'
BEET	SAMUEL FRASER Instructor in Agronomy, Cornell University
BEETHOVEN	HENRY T. FINCK Musical Critic 'Evening Post,' New York
BERKELEY, GEORGE	H. W. WRIGHT Of Cornell University
BERLIN	HERMANN SCHOENFELD Professor of Germanics, Columbia University
BIBLE	CHARLES WOODRUFF SHIELDS Prof. of Harmony of Science and Revealed Religion, Princeton University
BIRDS	ERNEST INGERSOLL Editorial Staff, Encyclopedia Americana

KEY TO PRONUNCIATION.

ä	far, father	ñ	Span. <i>ñ</i> , as in <i>cañon</i> (căn'yôn), <i>piñon</i> (pên'yôn)
ā	fate, hate	ng	mingle, singing
a or ä	at, fat	nk	bank, ink
ā	air, care	'ō	no, open
ā	ado, sofa	o or ō	not, on
ā	all, fall	ō	corn, nor
ch	choose, church	ò	atom, symbol
ē	eel, we	o	book, look
e or ě	bed, end	oi	oil, soil; also Ger. <i>eu</i> , as in <i>beutel</i>
é	her, over: also Fr. <i>e</i> , as in <i>dé</i> ; <i>eu</i> , as in <i>neuf</i> ; and <i>oeu</i> , as in <i>boeuf</i> , <i>cœur</i> ; Ger. <i>ö</i> (or <i>oe</i>), as in <i>ökonomie</i> .	ō or oo	fool, rule
ē	befall, clope	ou or ow	allow, bowsprit
ē	agent, trident	s	satisfy, sauce
ff	off, trough	sh	show, sure
g	gas, get	th	thick, thin
gw	anguish, guava	th	father, thither
h	hat, hot	ü	mute, use
h or H	Ger. <i>ch</i> , as in <i>nicht</i> , <i>wacht</i>	u or ũ	but, us
hw	what	ü	pull, put
i	file, ice	ü	between u and e, as in Fr. <i>sur</i> , Ger. <i>Müller</i>
i or ĭ	him, it	v	of, very
i	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din	y	(consonantal) yes, young
j	gem, genius	z	pleasant, rose
kw	quaint, quite	zh	azure, pleasure
ñ	Fr. nasal <i>m</i> or <i>n</i> , as in <i>embonpoint</i> , <i>Jean</i> , <i>temps</i>	'	(prime), " (secondary) accents, to indicate syllabic stress

THE ENCYCLOPEDIA AMERICANA

Ar^oma^tic Vinegar, a liquid consisting of strong acetic acid, and obtained by distilling crystallized diacetate of copper. Its aroma is due to the presence of *acetone*, but it is also usually highly flavored with preparations, such as cloves, calamus, etc. It has a pleasant perfume, and its vapor, when inhaled, has a powerful effect on the nostrils, and acts as a strong excitant on the whole system. The liquid is highly corrosive.

Arona, a-rō'na, Italy, an ancient town near the southern extremity of Lago Maggiore. In the vicinity is the colossal statue of San Carlo Borromeo, 70 feet high, exclusive of the pedestal, 42 feet high. There are silk, cotton, and metal works here. Pop. (1901) 4,700.

Aroo. See ARRU ISLANDS.

Aroostook, a-roos'tuk, a river in Maine. It rises in Piscataquis County, Me.; flows more than 120 miles in a circuitous course, and enters the St. John River in New Brunswick. It was an important factor in the settlement of the long-pending dispute concerning the boundary between the United States and British America.

Arouet, a'roo-ā'. See VOLTAIRE.

Around the World in Eighty Days, a noted romance by Jules Verne. Phileas Fogg, an English gentleman, wagers that a man can travel around the world in 80 days. He wins his wager, after a series of exciting adventures.

Arpad, ār'pád, the conqueror of Hungary, and founder of the Arpad dynasty, which reigned till 1301. He was born in the second half of the 9th century; died in 907. He was the son of Almus, whom the seven Magyar clans dwelling in the steppes northeast of the Caspian Sea had elected their hereditary chief about 880. Thus united into one nation, the Magyars, mustering about 25,000 warriors, crossed the Carpathians and conquered Hungary, when Arpad was elected their prince.

Arpeggio, ār-pěj'ō (Italian, from *arpa*, a harp), in music, the playing of a chord on a keyed or stringed instrument by sounding the notes, not together, but in rapid succession.

Vol. 2—1

Arpent, ar'pan', an ancient French land measure, ordinarily equal to five sixths of an English acre; but it varied in different parts of France.

Arpino, ār-pē'nō (ancient *Arpinum*), a town of southern Italy, celebrated as the birthplace of Caius Marius and Cicero. It is situated on a rising ground near the river Garigliano, was originally founded by the Volsci, and became a municipal town under the Romans. It is still a place of some importance, possesses a royal college and several churches, and manufactures woolens. Pop. (1900) 10,607.

Arqua, ār-kwā', a village of northern Italy, about 13 miles southwest of Padua. Here was the home of the poet Petrarch. A monument has been erected over his grave in front of the church. Pop. about 500.

Arquebus, ār'kwe-būs, an ancient species of firearm resembling a musket. It was fired from a forked rest, and sometimes cocked by a wheel, and carried a ball that weighed nearly two ounces. A larger kind used in fortresses carried a heavier shot. See ORDNANCE.

Arracacha, ār'ra-kā'cha, or **Aracacha**, a genus of umbelliferous plants of Southern and Central America. The root of *A. esculenta* is divided into several lobes, each of which is about the size of a large carrot. These are boiled like potatoes and largely eaten in South America.

Ar'rack, or **Rack**, a name applied by Orientals to a strong spirituous liquor distilled from rice, from the juice of the cocoanut, date, and other palms, or from molasses. The arrack of Goa and Colombo in Ceylon is distilled from palm-juice alone, after being allowed to ferment; that of Batavia and Jamaica from rice and molasses. The rice is turned into malt by being soaked in water and allowed to sprout, after which the arrack is distilled from it on fermentation taking place in the same way as whiskey from barley-malt. The rice is also often used without being malted. The distillation of the fermented liquor affords the third or worst sort of arrack; this mixed with a little water and

ARRAGONITE — ARREST OF JUDGMENT

again distilled gives the second best sort; a third distillation produces the best sort, which is seldom exported. The arrack sold in Europe is seldom genuine. Pure arrack is clear and transparent, with a yellowish or straw color, and a peculiar but agreeable taste and smell; it contains at least 52 to 54 per cent of alcohol. Not much of it is imported into England, but it is largely drunk in India and the East generally, the Indian and Pacific Islands, Africa, and South America. The arrack of Japan is known as *saki*.

Arragonite, a common but erroneous spelling for the mineral *Aragonite* (q.v.).

Ar'rah, a town of British India, in Bengal. The surrounding country is fertile and well cultivated, and near the town is a large and beautiful lake. It was rendered famous during the mutiny of 1857 by the heroic resistance of a body of 20 civilians and 50 Sikhs, cooped up within a detached house, to a force of 3,000 sepoys, who were ultimately routed and overthrown by the arrival of a small European reinforcement. Pop. 47,000.

Arrah Na Pogue, ar-*rā* na pōg, a play by Dion Boucicault. (q.v.).

Arraign'ment, in the practice of criminal law the calling of a prisoner by his name to the bar of the court to answer the matter charged upon him in the indictment. His innocence being presumed, it is the law, and is so laid down in the most ancient books, that, though charged upon an indictment of the gravest nature, he is entitled to stand at the bar in the character of a free man, without irons or any manner of shackles or bonds, unless there be evident danger of his escape, or of violence at his hands.

Arran, ār'ān, an island of Scotland, in the Firth of Clyde, 20 miles long, and 10 miles wide, with an area of 165 square miles. The island attains its loftiest summit in Goatfell, which is 2,900 feet high. The southern portion is rather hilly than mountainous, and contains several arable tracts of considerable extent and tolerable fertility. The geology of Arran has attracted much attention, as furnishing within a comparatively narrow space distinct sections of the great geological formations. The botany possesses almost equal interest, both in the variety and the rarity of many of its plants. Among objects of historical interest are the cave of Drumdoon, relics of Danish forts, and Druidical stones. Pop. (1900) 6,000. Consult 'A May Week in Arran' (1882).

Arras, ār'ras', a town of France, capital of the department of Pas-de-Calais, in the middle of an extensive and fertile plain, on the Scarpe, which here becomes navigable. It is a well-built town, and has several handsome squares and a citadel, but is no longer fortified. The chief public buildings are the modern cathedral, the extensive buildings of the former abbey of St. Vaast, now accommodating a museum and the public library of 50,000 volumes; the Hôtel de Ville, one of the handsomest in the north of France, with a fine Gothic façade; the theatre, Hôtel de la Prefecture, barracks, etc. Its industries are varied and important. In the Middle Ages it was famous for the manufacture of tapestry, to which the English applied the name of the town itself. The corn-market of Arras is the most important in the north of France.

It was the birth-place of Robespierre. Pop. (1900) 26,000.

Arrate y Acosta, ar-ra'tā ē ā-kōs'tā, a Cuban historian: b. Havana, 1697; d. 1766. His history of Cuba entitled 'Llave del Nucoo Mundo y ante mural de las India Occidentales' remained in manuscript until 1830.

Arrawak, ar'ra-wāk. See *ARAWAK*.

Arrebo, ar-rē-bō, **Anders Christensen**, a Danish poet. b. Arooskjøbing, 1587; d. 1637. He was made Bishop of Drontheim, Norway, when only 31, but deposed in 1622, owing to his objectionable life; he was afterward rehabilitated as preacher in Vordingborg. As the pioneer of the Renaissance movement, he is considered the father of modern poetry in Denmark. His rhymed translation of the 'Psalms of David' (1623), but especially his 'Hexameron' (1641), an imitation of a once famous poem of the French poet Du Bartas on the 'Creation,' are highly esteemed.

Arrest, the seizure of a suspected criminal or delinquent that security may be taken for his appearance at the proper time before a court to answer to a charge. Ordinarily, a person can be arrested only by a warrant from a justice of the peace; but there are exceptional cases in which he can be apprehended by an officer without a warrant, by a private person also without a warrant, or by what is technically called a "hue and cry."

Any peace officer, as a justice of the peace, sheriff, coroner, or watchman may, without a warrant, arrest any one committing a felony in his presence, 3 Hawkins Pl. Cr. 164, *Tiner v. State*, 44 Tex. 128; *Reg. v. Chapman*, 12 Cox. C. C. 4, or committing a breach of the peace, during its continuance, 3 Wend. N. Y. 384, or even to prevent the commission of a breach of the peace, *Rex v. Herns*, 7 C. & P. 312, 32 E. C. L. 522, and such officer may arrest anyone whom he reasonably suspects of having committed a felony, whether a felony has actually been committed or not. 40 N. Y. 463; 25 Abb. N. C. 298; 3 Park Cr. N. Y. 249; 99 Pa. St. 63.

A private person who is present when a felony is committed, 3 Wend. N. Y. 353; 1 Mood. 93; or during the commission of a breach of the peace, 10 Cl. & Fin. Hon. L. 28; 25 Vt. 261, may and should arrest the felon, and may upon reasonable suspicion that the person arrested is the felon, if a felony has been committed 3 Wend. N. Y. 353; 6 Term 315.

An arrest is made by touching the body of the person accused. The object of arrest being to make sure that he answers to a charge about to be brought against him, it does not follow that after being seized he is incarcerated; if bail for his appearance at the proper time be given, and the case be not too aggravated a one for such security to be accepted, he will be released till the day of trial.

Arrest of Judgment, in law, is the act or process of preventing a judgment or verdict from being carried out till it shall be ascertained whether it is faulty or legally correct. Judgment may be arrested (1) when the declaration made varies from the original writ; (2) where the verdict materially differs from the pleadings and issue thereon; and (3) where the case laid in the declaration is not sufficient in law to admit of an action being founded upon it. A mo-

ARRHENATHERUM — ARROW-ROOT

tion for arrest of judgment must be grounded on some objection arising on the face of the record itself. *People v. Thompson*, 41 N. Y. 1; *People v. Kelley*, 94 N. Y. 526. If the judgment is arrested all the proceedings are set aside, and judgment of acquittal is given, but this will be no bar to a new indictment.

Ar'henathe'rūm, a genus of three species of tall perennial grasses closely allied to the oat (q.v.). *A. elatius* or *avenaceum* (also known as *Avena elatius* and *Holcus avenaceus*), which, as these names imply, bears a resemblance to oats, and sometimes called oat grass and French rye grass, is widely cultivated for fodder in France. True rye grass (*Lolium*) is, however, not a close relative.

Arrhenius, ar-rā'nī-ūs, **Svante**, a noted Swedish chemist: b. in Upsala in 1850. He was educated at the University of Upsala and after making many original investigations became professor in the University of Stockholm in 1891. His researches have been of the highest importance, the establishment of the theory of electrolytic dissociation being due to him. This theory supplies a reasonable explanation of many chemical phenomena otherwise insoluble and correlates various facts between which no connection has been previously discovered. He has published 'Sur la conductibilité galvanique des électrolytes' (1884), and a treatise in German on electro-chemistry (1902).

Ar'ria, a celebrated Roman matron, wife of Cæcinnæ Pætus, consul during the reign of Claudius, about 41 A.D. Pætus having raised an unsuccessful revolt against Claudius, in Illyria, was condemned to die, but was allowed the option of ending his life by suicide, which the Romans did not deem a crime. Pætus hesitated; Arria seized the dagger, plunged it into her bosom, and then presenting it to her husband, said, "It is not painful, Pætus."

Arriaga, ār're-ā'ga, **Pablo José d'**, a Spanish Jesuit: b. 1562; d. 1622. He was the first rector of the Jesuit College in Lima and wrote a valuable history entitled 'Estirpacion de la Idolatria de los Indos del Peni.'

Arria'nus, a celebrated Greek historian, a native of Nicomedia, in Bithynia, who flourished in the 2d century under the Emperor Hadrian and the Antonines. He was a disciple of Epictetus, whose lectures he edited. While residing in Greece he gained the friendship of the Emperor Hadrian, who bestowed upon him the citizenship of Rome (124 A.D.), and subsequently appointed him prefect of Cappadocia. In this capacity he distinguished himself in the war against the Massagete. He was afterward advanced to the senatorial and even consular dignities. Like Xenophon, whom he imitated in style, he united the literary with the military character. His writings were numerous, but many of them have perished. His 'Anabasis' of Alexander the Great, still extant, narrates the Asiatic expedition of Alexander, and being based on the memoirs of Ptolemy Lagus and Aristobulus, who both served under that king, is deemed proportionably valuable. To this is added a book on the affairs of India, which pursues the history of Alexander, but is not deemed of equal authority. An epistle from Arrianus to Hadrian is also extant, entitled 'Periplus Ponti Euxini' (Periplus of the Euxine or Black Sea). There are also ascribed to him 'Treatise on

Tactics'; and a 'Periplus of the Sea of Azof' and of the Red Sea, of which the authority is doubtful. We possess also his 'Enchiridion,' a moral treatise containing an abstract of the practical philosophy of Epictetus. There have been various editions of the 'Enchiridion' and the 'Anabasis'. His philosophical works have been translated by T. W. Higginson (Boston 1891) and the 'Anabasis' by Chinnock (1893).

Arrondissement, a'rôn-des-mān, a name given in France to the subdivision of a department, or of the quarters of some of the larger cities, as in Paris. The arrondissement is under the government of a *sous-préfet*.

Arroo. See **ARRU**.

Ar'row, a missile weapon, straight, slender, pointed, and barbed, to be shot with a bow. See **ARCHERY**.

Arrowhead, *Sagittaria*, a genus of plants of the natural order *Alismaceæ*, distinguished by unisexual flowers, having three herbaceous sepals and three colored petals, numerous stamens, and numerous carpels, which are compressed, one-seeded, and on a globose receptacle. They are aquatic plants, natives of very different climates, from the tropics to the cold regions of the world. The common arrowhead (*S. sagittifolia*) is a beautiful plant, a native of England, with arrow-shaped leaves which rise above the surface of the water. It is one of those plants which have enjoyed an undeserved reputation as cures for hydrophobia. The corms (or solid bulbs), dried and powdered, have sometimes been used for food, but have an acrid unpleasant taste. The Chinese arrowhead (*S. sinensis*) is a native of China, and has long been cultivated in that country and Japan for its eatable corms, which, in a fresh state, are somewhat acrid, but abound in starch. It has arrow-shaped acute leaves, and a branched polygonal scape (leafless stem). It is grown in ditches and ponds. It is one of the plants sometimes cultivated in tanks in hothouses.

Ar'row Lake, the name given to an expansion of the Columbia River, in British Columbia, about 95 miles long from north to south. It is often regarded as forming two lakes — the Upper and Lower Arrow.

Ar'row-root, a fine grained starch esteemed for making desserts and invalid foods. It is extracted from the underground parts of various tropical plants, especially of the genus *Maranta* of the natural order *Marantaceæ*. The popular name is said to be derived from the practice of the South American Indians who used the freshly dug rootstocks as an antidote for poisoned arrow-wounds. Probably, however, the derivation is from the Indian word *ara*. The principal species is *Maranta arundinacea*, indigenous to tropical America and cultivated in the West Indies, India and other warm countries. It is a perennial plant about two feet high, has small white flowers and fruits about the size and form of currants. The rootstocks, which often exceed a foot in length and three quarters of an inch in diameter, are yellowish white, jointed and covered with loose scales which must be carefully removed before the extraction of the starch, because they impart their disagreeable flavor if allowed to remain. The process of extraction, which is simple but usually crudely practised, is as follows: The root-

ARROWSMITH — ARSENAL

stocks are dug when a year old, well washed, peeled, beaten to a milky pulp in deep wooden mortars, and well washed to remove the fibrous parts, which are thrown away. The crude starch is next passed through a sieve or a coarse cloth and allowed to stand until the starch has settled, when the water is drawn and the white residue again washed. After again settling, the water is drawn off and the pulp when dried in the sun is reduced to powder. On a large scale arrow-root is manufactured with the aid of specially constructed machinery, but the process is essentially as described. Bermudian arrow-root is considered the best in the market, and next to it is that of Jamaica. The East Indian product is believed to be inferior, perhaps because of adulteration with or substitution of other starches, practices induced by the great demand and the high prices paid for the genuine. Some of these other starches are obtained from closely related plants, among which may be mentioned certain species of the genera *Canna* (q.v.), *Curcuma* (see **TURMERIC**), *Manioc* (see **CASSAVA**), *Tacca* (q.v.) and *Arum*. Potato, corn, rice and wheat starch and fine sago are also sold for arrow-root, but may be identified by microscopical examination; the form and markings of the starch grains differ from those of the arrow-root granules. When dry, arrow-root is odorless, but when damp has a slight smell. Like other carbohydrate foods, it is a source of energy, but since it is deficient in nitrogen compounds it should be mixed with eggs, milk, or other substances rich in nitrogenous materials, to form a well-balanced diet.

The amount of fecula or starch present in the roots of the *Maranta* varies according to age, and runs from 8 per cent, in those of the young plants, to 26 per cent when full grown. The latter stage is reached when the plant is 10 to 12 months old; and the roots then present the following composition in 100 parts.

Starch, fecula, or arrow-root.....	26
Woody fibre.....	6
Albumen.....	1½
Gummy extract, volatile oil, and salts.....	1
Water.....	65½

Arrow-root is exported in tin cases, barrels, or boxes, carefully closed up. It is a light, opaque, white powder, which, when rubbed between the fingers, produces a slight crackling noise, like that heard when newly fallen snow is being made into a snowball. Through the microscope, the particles are seen to be convex, more or less elliptical, sometimes obscurely triangular, and not very different in size. The dry farina is quite odorless, but when dissolved in boiling water it has a slight peculiar smell, and swells up into a very perfect jelly. Potato starch, with which it is often adulterated, may be distinguished by the greater size of its particles, their coarser and more distinct rings, and their more glistening appearance. Refined sago-flour is used for adulteration, many of the particles of which have a truncated extremity, and their surface is irregular or tuberculated. Arrow-root is also sometimes adulterated with rice-starch and with the common starch of wheat-flour.

The starch of the cassava, manihot or manioc is sometimes imported into Europe under the name of Brazilian arrow-root. Potato-starch, carefully prepared, is sometimes sold as English arrow-root; and the farina obtained from the roots of the *Arum maculatum*, as Portland ar-

row-root. Otaheite arrow-root is the starch of *Tacca pinnatifida*. All these, as well as Oswego and Chicago corn-flour—the starch of maize or Indian corn—are so nearly allied to true arrow-root as not to be certainly distinguishable by chemical test; but the forms of the granules differ, so that they can be distinguished by the microscope.

Arrowsmith, Aaron, an English cartographer: b. Winston, 1750; d. 1823. He raised the execution of maps to a perfection it had never before attained. His nephew, John, b. 1790, d. 1873, was no less distinguished in the same field; his 'London Atlas of Universal Geography' may be especially mentioned.

Arroyo, ār-rō'yō, the name of two towns of Spain, in Estremadura. Arroyo del Puerco, about 10 miles west of Cáceres, has a palace of the old dukes of Benevente, and a parish church adorned with some paintings by Morales. Arroyo Molines de Montanches, about 27 miles south-east of Cáceres, is noted as the scene of the defeat of the French, 28 Oct. 1811, by the British under Lord Hill.

Arru (a-roo') **Islands**, a group belonging to the Dutch, situated to the south of western New Guinea, and extending from north to south about 127 miles. They consist of one large island and a number of smaller. They are all low and swampy, but well wooded and tolerably fertile. The natives belong to the Papuan race, and many of them have been converted to Christianity by Dutch missionaries. The chief exports are trepang, tortoise-shell, pearls, mother-of-pearl, and edible birds'-nests, which they exchange for European goods. Agriculture is in a primitive state, but maize, sugar-cane, beans, bananas, etc., are cultivated. Sago is the chief diet, little animal food being eaten. Pop. about 15,000.

Arsaces, ār-sā-sēz, founder of a dynasty of Parthian kings, who, taking their name from him, are called Arsacidae.

Arsamas, ar'sā-mās, a manufacturing town in the Russian government of Nijni-Novgorod, situated on the right bank of the Tiesha, 250 miles east of Moscow. It contains 34 churches, several convents and schools, 19 tanneries, several soap-works, linen factories, etc., and has a considerable trade. Pop. (1901) 12,380.

Ar'senal, a magazine, or place appointed for the making, repairing, keeping, and issuing of ordnance and other appliances required in warfare, whether in the army or navy. Sometimes the name is applied to an establishment where such articles are kept in store only, but the chief arsenals also embrace large factories or workshops. The principal arsenals of the United States are those in Allegheny, Pa.; Augusta, Ga.; Benecia, Cal.; Columbia, Tenn.; Fort Monroe, Va.; Frankford, Pa.; Indianapolis, Ind.; Kennebec, Me.; New York, N. Y.; Rock Island, Ill.; San Antonio, Tex.; Watertown, Mass.; and Watervliet, N. Y. There are also powder depots at St. Louis, Mo., and Dover, N. J.; a noted armory at Springfield, Mass., an ordnance proving ground at Sandy Hook, N. J. The Royal Arsenal, Woolwich, England, which manufactures warlike implements and stores for the army and navy, was formed about 1720. In France, each territorial military district (19 in all, including Algeria) has its own special arse-

ARSENIC

nal or its own depot of war material. There are naval arsenals at the great government dockyards, namely Cherbourg, Brest, Lorient, Rochefort, and Toulon. The chief arsenals of Germany are situated at Spandau, Cologne, and Dantzic, that at the first-mentioned place being the great centre of the military manufactories. The chief Austrian arsenal is the immense establishment at Vienna, which includes gun-factory, laboratory, small-arms and carriage factories, etc. Austria also purchases quantities of her military stores from private manufacturers. Russia has her principal arsenal at St. Petersburg with supplementary arsenals elsewhere. In Italy, Turin is the centre of the military factories.

Ar'senic, an elementary substance, resembling the metals in its physical properties, and formerly classed with them. In its chemical relations, however, it is decidedly non-metallic, and at present the books mostly place it among the non-metals, though it is still customary to speak of the element itself as "metallic arsenic," to distinguish it from the "white arsenic" of commerce, which is, properly speaking, an oxide of arsenic. Compounds of this element have been known for many centuries, chiefly on account of their poisonous character. The yellow sulphide of arsenic, otherwise called "orpiment," was known to Dioscorides, who called it *arsenikon*, probably on account of its powerful properties; the Greek word *arsen*, from which it is derived, signifying "male." Arsenic occurs in the metallic form in nature, usually with ores of iron, silver, cobalt, nickel, and antimony. Large masses of it are found at Zimeoff, in Siberia, and it occurs also in Saxony, Alsace, Bohemia, Transylvania, in the Harz, in Chile, in Japan, at Kongsberg in Norway and in parts of the United States. Combined with other substances, it is one of the most widely distributed of the elements, although the total amount of it in the world does not appear to be large. It occurs in various kinds of pyrites, and is therefore a common impurity in sulphuric acid (much of which is made from pyrites), and in substances in the manufacture of which this acid is used. The minerals known as kupfernickel (niccolite), realgar, orpiment, mispickel (arsenopyrite), and nickelglance (gersdorffite) contain it, as well as many others. The appearance of metallic arsenic varies greatly with the source from which it is obtained, and the method adopted for preparing it. That obtained from pyrites is usually compact, crystalline, and nearly white, while that obtained from arsenious acid is gray and pulverulent. The element is usually described as a "steel-gray metalline mass," which, at ordinary temperatures, has neither odor nor taste. One chemist (Ludwig) obtained arsenic with "a perfectly bright surface, resembling freshly granulated zinc"; but it is doubtful if this was the pure element, since in preparing it he mixed with it a small quantity of iodine. For commercial purposes, metallic arsenic is obtained by refining the element as it occurs in nature, or by extracting it from arsenopyrite. The process of extraction from arsenopyrite consists in heating that mineral in earthenware retorts or tubes, arranged horizontally in a long furnace, and each having a piece of thin sheet-iron rolled up and inserted into its mouth. On

distilling, most of the arsenic condenses on the sheet-iron, from which, after cooling, it may be detached. The product so obtained is further purified by mixing it with pulverized charcoal and re-distilling. The earthenware retorts that are used in the process are made with great care. They are composed of one part of fresh clay and two parts of pulverized bricks or old retorts, and are coated with a mixture of blood, loam, forge scales, and alum, which produces a glaze through which the poisonous vapors of the arsenic cannot penetrate. They are then fired. Arsenic is brittle and crystalline, and its hardness, on the mineralogical scale, is about 3.5. Its specific gravity ranges from 5.2 to 5.7, although a certain variety of it (according to Bettendorff) has a specific gravity as low as 4.71. It has several allotropic forms, one of which is crystalline, and the other black and amorphous. The specific heat of the crystalline variety is 0.083, and that of the amorphous variety is 0.076. Arsenic conducts electricity better than mercury does; for if the specific resistance of mercury at 32° F. be taken as unity, the specific resistance of arsenic is 0.373 at 32° F., and 0.534 at 212° F. The chemical symbol of arsenic is As, and its atomic weight is about 74.44 (Clarke). Its co-efficient of expansion is 0.00311 per degree F. Arsenic oxidizes slowly when exposed to the air, forming a gray powder which is sometimes sold under the name of "fly-powder." It is not affected by pure water. When heated in the air it burns with a blue flame, giving off a characteristic, highly disagreeable, garlic-like odor. When protected from the air, metallic arsenic volatilizes at a red heat, without melting; its vapor being a light citron yellow, and phosphorescent. When heated under heavy pressure, arsenic melts at about 900° F.

Metallic arsenic forms alloys with many metals, some of which are produced by pulverizing and intimately mixing the constituents, and subjecting them to a pressure of 6,000 or 7,000 atmospheres. If much arsenic be present, the alloys are usually brittle. Arsenic is an undesirable impurity in iron, in general, but it is sometimes added to iron and steel for the manufacture of small chains and ornaments, because it makes the metal susceptible of a very brilliant polish. When alloyed with copper, arsenic gives a brittle gray metal, having a brilliant, silvery appearance, which is used somewhat for making buttons. The chief use of metallic arsenic, however, is in the manufacture of small shot. Pure melted lead, when dropped from a height, tends to form tailed drops; but if arsenic be added in small quantities this tendency disappears, and the drops are much rounder. With hydrogen, arsenic forms a very important gaseous compound known as arseniuretted hydrogen, or arsine, and having the formula AsH_3 . This compound is best obtained by the action of sulphuric acid upon an alloy of arsenic and zinc. It is colorless, and so poisonous that Gehlen, its discoverer, was killed by inhaling a single bubble of it. Arseniuretted hydrogen burns with a bluish flame, and metallic arsenic is deposited upon a cold body that is held in the flame. Marsh's test for arsenic depends upon this fact. In executing this test, zinc and sulphuric acid are added to the solution to be tested, and the hydrogen evolved

ARSENICAL POISONING

is allowed to issue from a small jet, where it is lighted. A piece of cold white porcelain is then held in the flame, and if arsenic be present, the characteristic dark, metallic, mirror-like deposit will be produced, owing to the arseniuretted hydrogen that is evolved, simultaneously with the hydrogen. Antimony gives the same kind of a deposit, so that it is important to examine the deposit (or "arsenical mirror," as it is technically called,) to make sure that it is not composed of antimony. Marsh's test is extremely delicate, and will demonstrate the presence of incredibly small traces of arsenic, if proper precautions are taken to ensure absolute purity in the zinc and sulphuric acid that are used. Scheele's green (known chemically as "arsenite of copper") is a compound of copper, arsenic, oxygen, and hydrogen, of a light green color. It was formerly much used in calico printing and for wall paper. Schweinfurth green is a different compound of the same elements, and is used for similar purposes. A great diversity of opinion has prevailed among chemists as to the danger of using arsenical colors, especially in connection with wall papers. Some maintain that "there is no possibility of any arsenical exhalation arising from the walls, as has been alleged"; while others claim that certain microscopic fungi and other low forms of vegetable life act upon these coloring matters, and cause the elimination of arseniuretted hydrogen, which can actually be detected in the air of rooms hung with arsenical papers. Schweinfurth green is better known in the United States by the name "paris green," and is much used for preventing the destruction of crops by insects.

The most familiar compound of arsenic (with the possible exception of paris green) is undoubtedly arsenous oxide, As_2O_3 (often written As_2O_5), or "white arsenic," known to the general public simply as "arsenic." This is used extensively in the arts, in the manufacture of indigo blue and anilin; in glass-making, to remove the color due to the lower oxides of iron; in fly and rat poisons; in taxidermy; and for many other purposes. It is very poisonous, and in the 16th and 17th centuries was commonly used for removing persons who were conceived (by their enemies) to have outlived their usefulness. Nearly all the great poisoners of that period were women. In 1659 a secret society of young wives was discovered in Rome, whose chief object was to make away with the husbands of the members by the use of arsenical preparations. Hieronyma Spara, the woman who provided the members with the poison and instructed them in its use, was eventually executed, together with 12 others. An even more notorious case was that of the woman Tophania, who lived at Palermo and at Naples, and prepared, for wives who desired to be freed from their husbands, a poison known as *aqua Tophania*. This "aqua" purported to be an oil that oozed from the tomb of St. Nicholas of Barri; but as a matter of fact was an arsenical solution. "White arsenic" is not very soluble in water, and as four drops of Tophania's preparation were reputed to constitute a fatal dose, it is not unlikely that it consisted essentially of potassium arsenite, K_2AsO_3 , a substance which is formed when "white arsenic" is dissolved in a solution of potash. Tophania plied

her nefarious business from girlhood to the age of 70, but her crimes were ultimately brought home to her, and she was tortured and put to death. Detection almost certainly awaits the poisoner of to-day who uses arsenic, and a career such as Tophania's is absolutely impossible.

Ar'sen'ical Poisoning. Arsenic is now used in so many ways that accidental poisoning occurs very often. As a poison employed in committing suicide, and for slow poisoning with homicidal intent, its popularity is on the wane. The forms of poisoning mostly seen are of the chronic type. These occur from the use of paints containing large quantities of Schule's green or Paris green, from the use of spraying solutions, now so widely employed as a means of protection from insect and fungus pests, and from the addition of arsenic to food stuffs, as a preservative. Acute forms of poisoning are more often the result of attempts to commit suicide. In acute arsenical poisoning the early symptoms are those of an acute inflammation of the stomach and intestines, coming on about half an hour after taking the poison. There are violent cramp-like pains, with nausea, vomiting, and diarrhoea, closely following the premonitory symptoms of distress, difficulty in swallowing, and constriction in the throat. The severe symptoms multiply, the diarrhoea becomes watery, "rice water" and blood may appear in the vomit. A cold, damp skin, weak and feeble heart-action, collapse and sighing respiration may precede death, attended at times with convulsions. Death may occur within 24 hours, but it is apt to be delayed from two to four days, the patient usually dying of the secondary degenerations in the organs and of exhaustion. Death by arsenic is very painful. It is, moreover, an extremely uncertain poison, because of its insolubility, and of the vomiting reaction it induces. Many acute cases pass over into the chronic stage of poisoning.

Chronic arsenical poisoning may result from a single large dose, but more often results from the long-continued use of small quantities of the poison. In a recent outbreak of chronic arsenical poisoning in Manchester, hundreds of people were affected. The source of the poisoning was from arsenic in iron pyrites employed in making sulphuric acid; this certain sulphuric acid had been utilized in the manufacture of glucose. Several firms had purchased this glucose for the manufacture of beer, and many hundreds of the consumers of this beer suffered from various forms of arsenical poisoning. Chronic arsenical poisoning may result from the use of wall-papers and hangings colored by arsenical dyes, although such modes of poisoning may be considered extremely rare. The symptoms of this type of poisoning are of gradual onset: the patient is languid, weak, and loses his appetite. There is discomfort in his intestines and diarrhoea or constipation may result. A sub-acute inflammation of the mucous membrane of the nose and gums then develops, with sore gums, puffiness under the eyes, and running from the nose. Sneezing, coughing, and hoarseness may occur, various skin eruptions are not uncommon, and a curious pigmentation of the skin is nearly always observed. The patients progress until poisoning of the ends of the nerves begins, with disturbances in sensation,

ARSENIOUS ACID — ART

anæsthesia, paresthesia, and pain. There may then develop paralysis of the extremity, frequently the toe, (drop-toe); or the wrist, (drop-wrist). Paralysis of sensation may also occur. The course of a chronic poisoning may not be over three or four days, but it usually requires three or four weeks, sometimes longer. Some individuals use arsenic throughout their lives and are never poisoned. The treatment of acute poisoning consists in the thorough and prolonged washing out of the stomach and the use of large quantities of magnesia. Supportive treatment is needed in the stage of collapse. Heat, alcohol, and coffee are indicated. In chronic poisoning electricity and tonic treatment are required.

Arsenious Acid, the arsenical compound familiarly known and popularly called arsenic. It is obtained principally during the roasting of the arsenican nickel ores in Germany in furnaces communicating with flues. The ordinary arsenious (which is what is popularly known as arsenic) is a white crystalline powder, decidedly gritty, like fine sand, and with no well-marked taste. It is very heavy, so much so as at once to be noticeable when a paper or bottle containing it is lifted by the hand. It is soluble in water, to the extent of 1 part of acid in about 100 parts of cold water, and 1 part of acid in about 10 parts of boiling water. When placed in a spoon or other vessel and heated, it volatilizes and condenses in crystals on any cool vessel held above. By this means it can be distinguished from ordinary flour, which, when heated, chars and leaves a coal behind; and from chalk, stucco, baking-soda, tooth-powder, and other white substances, that when heated, remain in the vessel as a non-volatile white residue. In some countries, as in the mountainous regions of Austria, Styria, and the Tyrol, arsenic is eaten habitually, beginning with small doses and gradually increasing them. It is said to favor nutrition, and to improve the respiration in ascending heights. Some of the "arsenico-phages" can take great quantities with impunity.

Arsenolite, a native trioxide of arsenic, having the formula As_2O_3 (often written As_2O_5), and crystallizing in the isometric system,—usually in octahedrons. It is commonly white, with a vitreous lustre. Its hardness is 1.5, and its specific gravity about 3.71. It occurs in connection with ores of silver and lead, and with those of other metals when arsenic is associated with them. In the United States it has been found in Nevada and California. Arsenolite and senarmonite (an antimonial mineral of analogous composition and similar crystalline form) are collectively known by mineralogists as the "arsenolite group."

Arsenopyrite, ar-sen-o-pi'rīt ("arsenical pyrites"), a tin-white, opaque mineral, with a metallic lustre, crystallizing in the orthorhombic system. It contains arsenic, iron, and sulphur, and has the formula $FeAsS$. Its hardness varies from 5.5 to 6.0, and its specific gravity from 5.9 to 6.2. Arsenopyrite is largely used as a source of "white arsenic," or arsenic trioxide. It occurs chiefly in the crystalline rocks with gold and ores of silver, lead and tin. It abounds in Germany, England, and the United States.

Arsinoë, ār-sin'ō-ē, the name of several celebrated women of antiquity, the most noted of whom is the daughter of Ptolemy I. of Egypt

and Berenice: b. about 316 B.C.; she married Lysimachus, king of Thrace, in 300 B.C. Desirous of securing the crown for her own children, Arsinoë prevailed upon Lysimachus to put Agathocles, the son of his former wife, to death. This crime proved fatal to the Thracian king; for Lysandra, the wife of the murdered prince, fled with her children to the court of Seleucus Nicator of Syria, who took up arms in her favor. In the course of the war Lysimachus was slain and his kingdom taken possession of by the conqueror. Arsinoë now fled into Macedonia, which was soon overrun by the Syrian army. In less than a year afterward, however, Seleucus was assassinated by Ptolemy Ceraunus, half brother of Arsinoë. This queen, who held the city of Cassandria in Macedonia, was induced, under promise of marriage, to admit Ptolemy within its walls; but no sooner had he entered than her two children were butchered before her eyes. She succeeded in making her escape to Egypt, where she became the wife of Ptolemy II., Philadelphus, her own brother (279 B.C.), thus affording a precedent to these unnatural unions which afterward became common among the Greek rulers of Egypt. She bore no children to her brother, who, however, seems to have had a strong affection for her, as he called one of the districts of Egypt by her name and employed the architect Dinocrates to build a temple in her honor.

Arsin'oe, a city of ancient Egypt, on Lake Mœris, said to have been founded about 2300 B.C., but renamed after Arsinoë, wife and sister of Ptolemy II., of Egypt. The site of Arsinoë is now occupied by the town of Medinet-el-Faum. The sacred crocodiles were kept here.

Ar'son, the malicious and wilful burning of a dwelling-house or out-house belonging to another person by directly setting fire to it, or even by igniting some edifice of one's own in its immediate vicinity. If a person, by maliciously setting fire to an inhabited house, cause the death of one or more of the inmates, the deed is murder, and capital punishment may be inflicted. When no one is fatally injured the crime is not capital, but is still heavily punishable; it is a penal offense also to attempt to set a house on fire, even if the endeavor does not succeed. The New York Penal Code provides that a person who wilfully burns, or sets on fire in the nighttime, either (1) a dwelling-house in which there is, at the time, a human being; or (2) a car, vessel, or other vehicle, or a structure or building other than a dwelling-house, wherein, to the knowledge of the offender, there is, at the time, a human being, is guilty of arson in the first degree.

Many statutory changes have been made in the common law upon this subject. There are three degrees of arson in the State of New York. Arson in the first degree is punishable by imprisonment for any term not exceeding 40 years; in the second degree by imprisonment for a term not exceeding 25 years; in the third degree for a term not exceeding 15 years. Before the crime of arson is complete, the house, or some portion of it, however small, must be burned, or consumed by fire.

Art, in its most extended sense, as distinguished from nature on the one hand and from science on the other, has been defined as every

regulated operation or dexterity by which organized beings pursue ends which they know beforehand, together with the rules and the result of every such operation or dexterity.

In æsthetics, art as distinguished from science, consists of the truths disclosed by that species of knowledge disposed in the most convenient order for practice, instead of the best order for thought. Art proposes to itself a given end, and, after defining it, hands it over to science. Science, after investigating the causes and conditions of this end, returns it to art, with a theorem of the combination of circumstances under which the desired end may be effected. After receiving them, art inquires whether any or all of those scientific combinations are within the compass of human power and human means, and pronounces the end inquired after attainable or not. It will be observed here, that art supplies only the major premise, or the assertion that the given aim is the one to be desired. The grounds of every rule of art are to be found in the theorems of science. An art can then consist only of rules, together with as much of the speculative propositions as comprises the justification of those rules. Though art must assume the same general laws as science does, yet it follows them only into such of their detailed consequences as have led to certain practical rules, and pries into every secret corner, as well as into the open stores of the household of science, bent on finding out the necessities of which she is in search, and which the exigencies of human life demand. Hence, as Edmund Burke remarks, in his 'Treatise on the Sublime and Beautiful,' "Art can never give the rules that make an art." It must always owe them to science. Whatever speaks in precepts or rules, as contrasted with assertions regarding facts, is art; and hence it always adopts the imperative mood, whereas, science almost invariably adopts the indicative. Science is wholly occupied with declarations; art is wholly engaged with injunctions that something should be done. Thus, the builder's art desires to have houses, the architect's art desires to have them beautiful; and the medical art desires to cure diseases of the human body.

In a special sense art is the practical carrying out of the principles of science; a series of rules designed to aid one in acquiring practical skill or dexterity in performing some specified kind of work, manual or mental. The several arts may be arranged in two groups—(a) the mechanical, and, (b) the liberal or fine arts. The mechanical arts are those which may be successfully followed by one who does not possess genius, but has acquired the facility of working with his hands which long practice imparts. Such are the arts of the carpenter, the blacksmith, the watchmaker, etc. They are often called trades. The liberal or fine arts are such as give scope not merely to manual dexterity, but to genius; as music, painting, sculpture, architecture, etc.

In mediæval education, the arts signified the whole circle of subjects studied by those who sought a liberal education. This included science as well as art. The seven liberal arts, which, in the palmy days of Rome, plebeians were not allowed to study, were thus divided: (1) the *Trivium*—namely, grammar, rhetoric, and logic; (2) the *Quadrivium*—namely, arith-

metic, music, geometry, and astronomy. It is a remnant of this classification, which was in vogue as early as the 5th century, that we still speak of as the curriculum of arts at a university, and that graduates become bachelors or masters of arts. See ARCHITECTURE; MUSIC; PAINTING; SCULPTURE, etc.

Art, American'. The art history of America presents interesting conditions of receptivity, as well as original productivity; indeed, artistic taste, it may be claimed, was primarily transplanted or transfused into the budding art of "The Fair New World." True to the traditions of historical repetition, the ideals of ancient Greece inspired an Italian renaissance; French, German, and English art respectively, being viewed moreover at their best periods, give evidence of having been begotten through æsthetic assimilation and fruitful appreciation of the masterpieces of Angelo, Titian, Tintoretto, Rembrandt, Rubens, Veronese, and Velasquez. The early American school not only emulated these treasured qualities of the old masters, as far as accessible in painting and sculpture of originals or in replicas, but experienced a healthful art evolution, normally stimulated by the contemporary works of Gainsborough, Reynolds, Lawrence, and others, at the close of the 18th century. It appears in accord with the artistic spirit of international reciprocity, that America provided the British Royal Academy with its second president in the personality of Benjamin West.

Although it would be intensely interesting to explore the field of Pan-American art, revealing Aztec and other aboriginal archæological relics, we are limited to the consideration of the subject co-incidental with modern art and civilization. The works of Washington Allston, Gilbert, Stuart, West, Copley, Trumbull, Vanderlyn, Jarvis, Peele, Cole, Harding; and, at a later period, of Morse, Eliot, Mount, and many others, afford invaluable examples of rare intrinsic value, with chronological evidences of the early development, impeded by all sorts of obstacles, of inborn genius and unmistakable tendencies of the American progressive element even in the province of fine art. A representative collection of the famous works by the American painters mentioned, had it been secured, would certainly to-day constitute a rare gallery of æsthetic "Americana" that well might be preserved for all time—"con amore"—"*pio patria et gloria*", enkindling American art patriotism in line with that shown for the army and navy, agriculture and commercialism. It is too late, however, to secure the marvelous masterpiece by Allston, 'The Legend of the Bloody Hand,' it having unfortunately been destroyed by fire, and many other gems of renown are now lost sight of, through lack of proper preservation and of popular appreciation. Vanderlyn's 'Ariadne,' however, has fared better in company with invaluable portraits, painted by these gifted men and now in possession of the New York Historical Society. 'Marius Sitting Among the Ruins of Carthage,' a work that secured Vanderlyn, in reward for its merits, a first-class gold medal at the Paris Exposition, was a product of this period. The most important epochs of American history have been represented by native artistic talent. The sailing and landing of Columbus, the exploits of De Soto, the subj-

gation of savage life to that of civilization, Colonial and Indian warfare, the declaration of national independence, Revolutionary battles, Washington crossing the Delaware, and like famous subjects for painting and sculpture, that manifestly should be preserved by governmental direction. Although so long and disastrously belated, these facts and conditions logically suggest the formation of a national gallery of American art. The landscapes of Thomas Cole upheld, as did those of Turner, the traditions of Claude Lorraine; still in the spirit of a pioneer he proclaimed the grandeur of the primeval American forest in paintings direct from nature. His 'The Course of Empire,' now in possession of the New York Historical Society, a work that has never, we believe, been reproduced in any form, presents in four grand paintings the sway of civilization from savage life to an Arcadian period; then onward to the consummation of earthly power and magnificence; followed by the decadence occasioned by war of the elements, and that instigated by "man's inhumanity to man"; finally, the literal scene of monumental destruction and sublimely solemn desolation. Before dismissing attention called to this early period influenced, as stated, by foreign methods of technical expression, native American genius found little public appreciation; still it faithfully progressed. Again about this time matter-of-fact utilitarianism appeared to dispel the ideal artist's poetic hopes, while every encouragement followed the success of practical scientific talent. Washington Irving essayed to be a painter, but concluded to devote his life to literature and the power of the pen. Robert Fulton, who began his career as a skilful landscape and portrait painter, attracting the friendship of Benjamin Franklin, who encouraged his studies abroad, and gave him letters to Benjamin West and others, returned to his native land to find that scientific conditions were required rather than a demand for the credentials of culture in works of fine art. The result was steamboat navigation. Another triumph for science may be recorded. Franklin himself had captured lightning from the skies; still it remained for the imagination and artistic skill of the professional painter, Samuel Finlay Breese Morse, the first president of the National Academy of Design, to subjugate the marvelous electric element that joins as neighbors all mankind.

Nevertheless, the fine arts flourished; even modern travelers' tales of the wonderful scenery of two great continents stimulated artists and the lovers of art. "The Heart of the Andes," "Niagara," "The Arctic Region," "The Rocky Mountains," "The Catskills," "Lake Champlain," "Lake George," and the "Hudson River," all were delineated. Along with this demand for great subjects, often commensurate in quantity as to size of canvas with Ruskin's mathematical maxim: that the greatest work of art is the one presenting the greatest number of great ideas; there still prevailed in marked instances the glorious traditions of full-habited oil-painting to be found in the æsthetics of familiar environment of earth, air, and water, as embodied in artistic values and soulful qualities—creations in harmony with Michel, Ruysael, Constable, and the masters of Barbazon and Fontainebleau. Again, while scientific influences appear in the works of Durand, Church, Casalear,

and Kensett, they asserted a truly American artistic individuality; they copied directly from nature. They thought of no school nor technique, but carefully imitated what they saw. All these men with one exception had been practical engravers, laying down the burin and the needle-point to take up the pencil and the brush. Their respective biographical and æsthetic records in American art will be enduring; yet there comes the reflection that had their professional training been more liberal and adequate they would have attained to higher things. The importance of masterly academic training cannot be overestimated; as a means to an end, however great, education is the only acknowledged guide for the individual artist and for the community even in matters of taste. Nothing is more creditable to a civilized people than its credentials of culture. The formation of a fine art association in its chief city was at the beginning of the past century an occasion of vast importance to our commonwealth. The first action was taken in 1802 by a few prominent citizens, and six years later a charter was obtained with the name of The American Academy of Arts. The first officers under this charter were Robert Livingston, president; John Trumbull, vice-president; DeWitt Clinton, Dr. David Hosack, John R. Murray, William Cutting, and Charles Wilkes, directors. A school was equipped with casts brought from Paris by Mr. Livingston, and exhibitions of paintings and statuary were held for a time in an unused riding school in Greenwich Street near the Battery. Public interest in this movement was soon transferred to grand panorama schemes conducted by Vanderlyn at the "Rotunda," and by others with similar enterprises. It was not until the year 1826 that the artists themselves, with Morse as president, founded the National Academy of Design in the earnest interests of American art, with educational purposes and exhibitional facilities; its influence increasing until the present day. Its membership consists of one hundred academicians and an equal number of associate members, including the most distinguished painters and sculptors of America. Its list of fellowship for life likewise includes the most prominent public-spirited patrons of American art.

Established for many years in the Academy building, tastefully modeled after the Palais Ducal of Venice and forming an attractive urban landmark, lack of accommodations for its growing schools, and crowding commercial surroundings, required a move to more suitable quarters. Unlike the Royal Academy of London, with its plethoric treasury, and similar institutions situated in other European art centres, the academy is without governmental endowment, and may well enlist American art patriotism in the cause of æsthetic culture in fostering the fine arts of painting, sculpture, and architecture. Other societies of American artists, water color societies, and architectural leagues make annual exhibitions in New York; while art institutes throughout the United States, in various cities attest the extent and importance of American art. We, as Americans, are an artistic people, cosmopolitan, and composite, uniting the genius of all nations. The æsthetic field of general American artistic taste and industry has been strenuously productive. The

ornamental, orderly, and decorative work in clay, on china, glass, wood, and stone as a tasteful and profitable divertimento, begins with the training of the kindergarten. Black and white illustration and etching has been awarded first-class medals at home and abroad. The beautiful and refined exemplified in aquarelle and oil-painting, in portraiture, genre, and pastoral; in sculpture and architecture; and finally the grand and sublime of high art, all confirm the achievements of American art and artists.

In advancing these three divisions,—the ornamental, the beautiful, and the sublime,—as a guide, we approach the philosophical consideration of the subject of fine art. What is, and what is not, fine art? Shakespeare's injunction "to hold, as it were, the mirror up to nature" is the best artistic advice ever given. Bacon in his essay is not so direct. He asks which is the greater trifter, one who would make a personage by geometrical proportions (perhaps by the fabled Greek cabala) or another who would select the best parts of divers faces to make one excellent (a veritable composite picture)? He concludes at last that a painter may make a better face than ever was, but he must do it by a kind of felicity, as a musician who makes an excellent air in music, not by rule. If ever there was an artist he was Shakespeare—if ever there lived a scientist, Lord Bacon was, perhaps, the most eminent, and in their respective views and definitions we find the differentiation between science and art. In any given work in so far as it may be mechanically constructed is presented a scientific product; and in so far as reproductive processes may exhaustively duplicate it, it falls short of the possibilities of fine art. An etching by a master may be an autographic art creation; but when it is possible through photography, photo-gravure or chromo-lithography to so perfectly duplicate a painting, that the reproduction presents all the merits of the original, it may be realized to science rather than be accepted as genuine fine art. True consummate mechanism must ever go hand in hand with fine art; still a great work of art presents the maximum of art to the minimum of mechanism. A painting portraying living objects with a sharp contour, such as may delight the photographer, without the suggestive quality of stereoscopic relief, does not hold the mirror up to nature, and the work may be classed with scientific achievements even if accredited to the consummate mechanism of a Messonnier. Indeed reproductive processes have served a great purpose in defining the line of demarcation between science and art. Affectations have been swept away by a revelation of their superficiality; while the possibilities of inimitable fine oil-painting, a medium and technique that, of all ever employed, has the fewest possible limitations, have been enhanced as seen in the works of the American artists already mentioned; and in those of a growing group of American idealists, colorists, and tonalists. Various have been the fashions or "isms" that have dominated American art at different periods of its history. Preraphaelitism as advocated by Ruskin was one of the earliest imported. Being appointed the legal executor of his hero-client, as well as being an enthusiastic admirer of his work, Ruskin claimed for Turner not only the grander

qualities, but a command of detail that rivaled the ancients, although the artist, we are told, frankly declined the compliment. Turner was unquestionably the greatest modern master of decorative and scenic effect in pictorial combinations representing earth, air, and water, being, indeed, entitled to the apotheosis of synthesis; still diligent search in the archives of the Royal Academy and National Gallery fails to reveal the qualities attributed to him by the author mentioned. Ruskin's enthusiasm proved contagious throughout the art circles of England and America; solicitous friends as well as the most influential art writers pleaded with the tyro to emulate not the work of Michael Angelo, Titian, or Raphael himself, but to follow in the footsteps of Perugino and Raphael's father or grandfather. This verily seemed like unto the dotage of imbecility in the light of Raphael's glorious art that had evolved the immaculate Sistine Madonna. He was brave, indeed, in the field of American art of that day, who could resist the popular and professional pressure of this pseudo-aesthetic movement. No vestige of it remains, and no wonder it was followed by impressionism—as a free and joyous transition from mechanical restrictions in art. This was the artistic attempt to present the maximum of soulfulness conveyed to the world by finest art; employing the minimum of materiality and mechanism as seen in the rendition through mental vision of the fleeting sunset or twilight—such as may only be materialized on the morrow; the epitomization perhaps of a day's outing under the open skies or flying clouds, or in the sublime thunder-storm; in fact, the entire realm of imagination is unfolded by artistic impression. Such was the accepted province of genuine impressionism originally as associated with the artistic convictions and poetic spirit of Corot, Monet, Monticelli, William Hunt, William Page, George Fuller, and many others. Impressionism naturally evolves symbolism and idealism, but in too many instances has deteriorated into affectation and mysticism. Premeditated and assumed mysticism is the *dernier-resort* of mediocre painters and sculptors, as well as of the minor poets. It may not be mistaken for sublime spirituality. Dante, Shakespeare, and Milton, treating even divine themes, never nebulized their ideas in mysticism; the same may be said of Bryant and Longfellow; while Poe, temperamentally, a mystic solitudinarian, in the field of poetic art presented the apotheosis of spirituality.

The crowning glory in the art of any civilized country is that of naturalism. In the truest sense it utilizes even scientific "dissecta membra," as enumerated, and subjugates the same to the entirety of art. The comprehensive structural organic presentation of material nature, suggesting the qualities of size, form, weight, color, and perspective values; chiaroscuro, and, above all, the ultimatum of expression and tone. These enduring qualities characterize the art of Innis, Martin, Wyant, Hunt, and Page, and the growing group of American tonalists of the naturalistic school. A great advantage exists in American art from its cosmopolitan resources. In Paris one sees nothing but French art; in Munich, the German school; in London, English art, while the art institutions of America contain specimens of masterpieces from every

ART EDUCATION

source, notably the collection of the Metropolitan Museum of Art, and art institutes of Brooklyn, Boston, Chicago, Philadelphia, and Pittsburgh, as well as collections in all our large cities. While every art centre of Christendom seems to be provided with an American colony of artists and students, expatriation is no longer a necessity in order to obtain an education in fine art. The Academy and various art student leagues are conducted by eminent instructors distinguished with every honor obtainable at home or abroad. The prospects of a greater appreciation of American art open with the new century, as interest in the pursuits of peace should naturally follow national expansion. Advocacy of our chief art educational institutions is a feature of metropolitan aggrandizement; millions have been given to libraries and various institutions of learning; and fine art should be included with erudition, as the essential credential of culture. Timely attention may be called to the requirements of the pioneer American art institution, founded by the immortal Morse and his co-workers eminent in art instruction, and being associated with the career of America's greatest masters in painting, sculpture, and architecture. In accord with urban expansion it has departed from its classical landmark, a diminutive "Palais Ducal," to a most accessible and beautiful site, upon the acropolis of the metropolis, facing Cathedral Driveway, Morningside Park, New York city. As the leading exponent of American art instruction, through schools and exhibitions, it is planned to erect an edifice that shall do justice to the artistic taste of the New World's metropolis, and to the original National Academy of Design.

The Department of Commerce just established by the general government is a step in the right direction of national affairs, and may make clear the way for the proposed Department of Art and Industries. It has been repeatedly advocated and constant evidences of its requirement as an absolute necessity have been presented to the government and to the people; still it is being detrimentally delayed. The appropriations for national and international expositions have repeatedly been used in a manner giving anything but satisfaction. Commissions and contracts for statuary, monuments, and architecture that should receive the supervision of expert art judgment are left to provisional committees of statesmen, who frankly admit their inability to judge in the affairs of fine art. The disastrous experiences resulting from this careless management of each and every international exposition, including the Centennial, the New Orleans, the Chicago Columbian, and the Buffalo Pan-American, certainly teach that no similar enterprise should be thrust upon the community for co-operation through flattering prospectuses, promises of profit, etc., until matured and definite plans and specifications shall have been officially inspected, approved or rejected by the projected national department of art and industries; this would also provide a valuable bureau of information in art affairs, enabling legislator and citizen to act or vote intelligently in regard to any appropriation, commission or tariff. The practical utility and public good to be derived from such a department may be demonstrated in many instances. A member of Congress having been appointed upon a committee assigned the duty of super-

vising the ground immediately surrounding the House of Representatives was astonished to find that millions of dollars had been expended upon the same; each new committee annually appointed having exercised its taste and judgment on the important matter. It was concluded that the advice of an expert landscape architect be secured, and this being done, the expenditure was practically ended. Again the enormous expense of indiscriminate illustration of congressional and department literature or printed matter has, to-day, caused anxiety and criticism. So in relation to all official cases requiring expert art supervision, eclectic sense and æsthetic taste should be at the service of the government. The plan involves no untried innovation; the French nation has its Minister des Beaux Arts, who is a member of the Cabinet of the Republic of France, leading the world in art affairs, taste, and fashion. The establishment of Municipal Art Commissions is a step in the right direction. The task of correcting the contour of metropolitan architecture seems, indeed, herculean; individual buildings of great beauty are adjoined by the most heterogeneous structures; a three-story house appears between one of eight and a sky-scraper of twenty. In no capital of Europe would such incongruities be permitted, and every possible facility should be afforded our Municipal Art Commissions to correct this chaotic condition. The one effectual way, with general public guidance, can alone be secured by the establishment of a National Department of Art and Industries; presenting valuable statistics with all existing architectural models and designs. Victor Hugo said "the beautiful is as useful as the useful, more so, perhaps." European municipal politics profit by the practical application of this fact; great cathedrals, public statuary, and fountains, picture galleries and museums attract multitudes of tourists, thereby financially as well as æsthetically benefiting communities that keep in the vanguard of culture and civilization.

Bibliography.—Allston, 'Lectures on Art and Poems'; Clara Clement and Lawrence Hutton, 'Anecdotes of Painters, Engravers, Sculptors, and Architects'; Cummings, 'Annals of the National Academy of Design'; De Mulder, 'The Philosophy of Art in America'; Dunlap, 'History of the Rise and Progress of the Arts of Design in the United States' (2 vols.); Kohler, 'American Art'; Sheldon, 'American Painters.'

CHAS. H. MILLER, N. A.,
Municipal Art Society, New York.

Art Education. Since 1870 the rapidity of the development of art and industrial education in the United States has been so marked and so effective, the rapid increase in the number of special schools and museums of the fine arts so striking, as to make exceedingly difficult a satisfactory survey of this subject within the limits of the space allowed. The movement for the general introduction of drawing in the public schools, and of definite endeavors to promote art education, with a purpose to develop and improve the art industries of a people, seemed alike sudden in England and in the United States. In England it was apparently the definite result of the first world's fair—the exhibition of 1851; in the United States it had its origin in Boston in 1870, where it was a direct outcome of the English movement.

ART EDUCATION

The Centennial exhibition in Philadelphia in 1876, where the work in drawing of the Massachusetts normal art school and of the public schools in Boston was shown, made possible the rapid and remarkable development throughout the United States of the two kindred elements in education, namely, industrial art drawing and manual training.

As the English were long held to be a people hopelessly inartistic and devoid of art possibilities, their wonderful development since 1851 in so many lines of artistic manufactures challenges investigation, especially by a people long similarly accused as being innately inartistic, and for a long period, it must be admitted, apparently deservedly so accused. The causes of this lack of art development as recited by Haydon were the same in both countries. That these causes were amply sufficient to account for this almost entire absence of any national evidence of art consciousness,—without compelling the admission of any inborn lack of mental capacity,—Haydon sought to demonstrate, by an appeal to the art development of England during the 13th century: "When England, in her knowledge of form, color, light, shadow, and in fresco decoration, was in advance of Italy; and had her progress not been checked by the Reformation, would have been at the head of Europe." "Show the people of England fine works," said Haydon; "give them the opportunity of study and the means of instruction; teach them the basis of beauty in art, and then give your opinion, if you like; but you have no right to condemn your fellow countrymen when you give them none of the advantages foreigners enjoy; when you have no schools for art instruction, no galleries open to public view, no national collections, no schools of design, and when you refuse to allow that art has a public function, and absolutely withhold from it all public support."

However true is his picture of the absence of any opportunities for the people to see works of art, or to enjoy any personal training in the elementary knowledge of art in the England of his day, the lack of all such opportunities in the United States was ten-fold greater. The Puritan immigrants of New England had all the abhorrence of art which marked the followers of the Reformation, and for two centuries the bare whitewashed walls of their plain meeting-houses were eloquent in protest against the art adornments of ancient church or chapel. Nor did the long, hard struggle to wrest sustenance from stony soil and stormy sea afford any space of leisure for those artistic occupations which to the stern Puritan were worse than folly.

Such was the situation, alike in England and the United States, during the first half of the 19th century. The exhibitions of 1851 and 1876 seem in turn to have revealed to each people their own artistic deficiencies.

Progress of Art Education—In 1749 Benjamin Franklin published his proposed 'Hints for an Academy,' and enumerated as the most useful studies, arithmetic, writing, drawing, and mechanics. In this connection drawing is seen to be reckoned with mechanics as a useful study. So more than 100 years before Boston had put drawing into its public schools, this Boston boy sought to have his fellow citizens of Philadelphia adopt it in their schools as a required study.

In a Lancastrian school presided over by Mr. Fowle in Boston in 1821, the method prevailed of having the younger pupils taught by those of their fellow pupils a little in advance of them. This method was, in its fundamental idea, successfully adopted by Walter Smith, in his first introduction of drawing as a required study in the public schools of Boston, and has since been followed in many of the public schools throughout the country. The arguments for the teaching of drawing in the public schools are clearly and concisely stated by Mr. Fowle in his introductory words to the third edition of his book on drawing, issued in 1830. Mr. Fowle also introduced in his school, physical science, music, and, for the girls, needlework. In this sewing form of "manual training" Miss Dorothy Dix, later the noted philanthropist, was his first teacher. So it appears that our modern new educational movement was clearly foreshadowed in this Boston school three quarters of a century ago!

In 1838 Henry Barnard, editor of the 'American Journal of Education,' delivered an address in many parts of the country on the topic of industrial education, and urged that drawing should be taught in the public schools. In the 'Connecticut Common School Journal,' published in Hartford, of which Dr. Barnard was editor, he reprinted the report of Prof. Stow on Prussian schools, made to the legislature of Ohio in 1838. In occasional numbers during succeeding years much attention was given to the subject of drawing in its various phases. In 1838-9 Miss E. P. Peabody gave a course of free lessons in drawing in the Franklin School, Boston, and in 1841-2 a similar course to a class of 100 teachers of primary schools. Miss E. P. Peabody and her sister, Miss Mary Peabody (later Mrs. Horace Mann), each published an elementary treatise illustrating their methods of teaching drawing and reading.

Such is a brief summary of a few of the early efforts by American educators to introduce the study as one of the essential elementary studies to be taught in all public schools. Similar vain efforts to promote the early training in drawing were from time to time made by leading artists. Among these perhaps the most notable and earnest attempt was made in Philadelphia by the distinguished artist Rembrandt Peale during the years 1843-4. As in Boston and in Philadelphia, earnest efforts to introduce the study of drawing in the schools long preceding 1870, had been successfully thwarted by the opposition based chiefly on ignorance and lack of appreciation; so it resulted in Baltimore, when in 1848-9 Mr. William Minifie, a remarkable man, taught drawing in that city as a science, and not simply as picture-making. This competent master was, however, removed, through the influence of an unsympathetic, ignorant committeeman, and so Baltimore lost the opportunity, else within reach, of anticipating the success of Boston by a quarter of a century. Mr. Minifie published his system of teaching, drawing, and perspective and shadows, which has long held its place as a recognized authority. About 1852 this work was adopted as one of the regular text-books, used in the South Kensington art schools of London, Eng., and which, it may be fairly assumed, Walter Smith studied; at least the underlying principles of the system of Prof. Minifie and those of Prof. Walter Smith

ART EDUCATION

are practically identical. As professor of drawing in the School of Design of the Maryland Institute in 1852-4, Prof. Minifie delivered and published three public addresses on drawing and design; in these the teaching of drawing as a regular study in the public schools was eloquently urged. To one who remembered the ability and methods of Prof. Minifie, and the work done by his pupils of the high school, as far back as 1848, the exhibition made of drawings by the Baltimore High School in the Centennial exposition in Philadelphia in 1876 was pitiful indeed.

Cleveland, Ohio, seems to have been more fortunate than the cities whose experience has just been briefly recited. In 1849 drawing was put in the schools as a regular exercise, and after a few months was intrusted to the regular teachers of the public schools, who eventually found in the late Prof. John Brainerd an enthusiastic instructor, who took such interest in their work that he followed them to the schools and aided them in teaching the pupils; in the end the professor was put in charge of the work in all the schools, and for several years remained with gratifying results. He published a manual for use in the schools. Subsequently Prof. Brainerd was for years an examiner in the United States patent office in Washington.

In this brief summary of various sporadic efforts in different cities and communities to introduce drawing in the schools, it is clear that the desirability of general instruction of the school children in drawing was in the process of becoming a popular belief, and in American communities this is usually the precursor of legislative action. While these efforts, as we have seen, had been confined to no single section or State, and indeed in some towns and cities drawing had already secured foothold in the schools, the movement in Boston, and in a degree through the State of Massachusetts, was more pronounced than elsewhere. In this State certain studies which are required to be taught in all public schools are enumerated in the law, while certain other studies are recorded as permissible at the discretion of the school committee. Thus, the trend of the upward and onward direction in the progress of elementary education is indicated by the appearance of certain studies as "permissible." In the law of 1860, "algebra, vocal music, drawing, physiology, and hygiene" are thus recorded as permissible. This is believed to be the first legal recognition of drawing in this category. In 1869 the board of education is directed to prepare a plan for free instruction of men, women, and children in mechanical drawing, applicable to all towns and cities of 5,000 inhabitants or more. In the law of 1870 "drawing" appears as a required study in all public schools, and "any city or town having more than 10,000 inhabitants shall annually make provision for giving free public instruction in industrial or mechanical drawing, either in day or evening schools under direction of the school committee." The annual reports of the board of education of Massachusetts, about that time, show great interest in promoting the study of drawing, and later in developing technical industrial education with special reference to the manufacturing interests of the State.

In the report of 1870-1 "The Worcester County Free Institute of Industrial Science" in the city of Worcester (changed in 1877, by

act of legislature, to "The Worcester Polytechnic Institute"), incorporated in 1865, is highly praised and pointed out as the only school in the State where such an education can be obtained.

As already indicated, the history of the slow development in the artistic training of youth in this country closely resembled in its several stages that of its progress in England, though, happily, there is here no story of individual effort and failure quite so tragic as that of the unfortunate Haydon; though the story of the last days of Walter Smith in America, just before his return to his native country, where he was gladly welcomed to an honorable career, all too brief owing to his untimely decease, is not one to be dwelt on by Americans with any especial pride. He brought rare and precious gifts to America, while to his splendid abilities as a great teacher, and to his contagious enthusiasm, which inspired the eager youth who clustered about him, the final success of the new elements in popular education — industrial art and manual training — are more largely due than to any other single influence.

Although during a century of progress sporadic efforts were made in various localities to introduce the teaching of drawing in schools, there was no permanent or general success. It was not till the system of public schools had become general, and the experiment of teaching the same thing at the same time to a large number of pupils had been proved feasible, that the time was ripe for the general introduction of industrial drawing and manual training. Before this the teaching of drawing had been a personal matter between pupil and teacher, and no conception that it was possible to teach the elements of drawing to large classes at once had dawned upon educators.

The so-called "farm schools," which had a certain vogue in the earlier years of the present century, had proved failures as might easily have been foreseen, since it was not found feasible to work young men for remuneration so constantly, as was requisite to make them self-supporting as well as school-supporting, while taxing them with the mental work essential to their obtaining anything that would merit the name of an education.

In the first annual report made by Gen. John Eaton, commissioner of education, in 1870, there appeared an interesting record of the results attained from an effort to ascertain the direct worth to a workman of the education given in the common elementary public schools. The concurrence of testimony showing that even this small portion of knowledge and mental training was of real pecuniary value to its recipient was convincing, leaving no room for question but that the community was amply repaid for all the cost of the common schools by the increased earning power of their pupils. If this was true of a course of study simply giving the elements of knowledge, the inference is logical that those forms of education which gave direct capacity for higher grades of productive work must be so much the more valuable. In the progress of the concurrent educational movement of that time, looking to the development on the one hand of industrial facility, and on the other to that of artistic power, the commissioner was greatly interested, especially in the Massachusetts experiment of introducing the study of ele-

ART EDUCATION

mentary drawing—essential to both phases of the movement—in all the public schools of the State. This movement was begun in Boston by the well-known educator, long the city superintendent of schools, the late Hon. J. D. Philbrick, in union with the late Hon. Charles C. Perkins,—the latter the leading authority in the city in all matters relating to the fine arts,—and in connection with some of their associate members of the city board of education. Their purpose was to introduce the study of drawing as one of the required studies in the common schools of the city and State. They were fortunate in securing, in 1870, the services of a leading English art master, the late Walter Smith, who was made "art director," in charge of drawing in the schools of the city and the State.

In a pamphlet of some 56 pages (Clarke, 'Drawing in the Public Schools,' Circular No. 2, 1874; Bureau of Education, Washington, D. C.), brief statements of the desirableness of such elementary art training in our American Schools, and of the efforts made by European countries to promote such art training among their people, were given. Especial mention was also made of the English efforts both to develop artistic industries and to extend the teaching of drawing throughout their schools by means of the South Kensington institution. In addition it was sought to give a brief account of such art institutions and collections as were open to the public in the United States; to take an inventory, as it were, of the means at hand for the development of art education in this country. No list of such public art collections existed, and the attempt to secure such a list was undertaken with all the resources of the United States Bureau of Education. The trivial result of all this effort, as shown by the four pages of scattering statistics at the end of the circular, was ludicrous, while the poverty of the United States in art treasures available for the public, as thus exposed, was appalling. The interest taken by educators and the public generally in this small pamphlet, in view of the world's fair to be held in Philadelphia in 1876, in which coming event increasing interest was shown, and its efficacy in securing information, before so difficult to procure, led to the plan of further publications in the same line, and to the preparation by the present writer, as author and editor, of the special report upon the world movements in the development of artistic and industrial education and of like movements throughout the United States, since issued by this bureau in four large volumes. (See Bibliography at close of article.) As there was little literature available concerning this comparatively new educational movement, and none at all within reach of the majority of the teachers of the country, copious appendices were added to each volume of this report.

In view of the marvelous progress in providing educational facilities for art and art industrial development that has gone on in the United States since the publication of the little pamphlet in 1874, I venture to quote from it a couple of pages showing the author's belief in the American possibilities of such development a quarter of a century ago:

While, in the countries of Europe, whatever relates to the people in education, as in other matters, is in the control and general direction of the central government, so that what the central power decides to do

is readily and immediately set in motion throughout the entire country, in the United States there is wisely no such central control. This power inheres to the States and to the local communities within the States. This very circumstance though somewhat, it may be, delaying the adoption of useful measures, yet renders the wise adaptation of training to the peculiar industries and needs of the various parts of the country far more probable. It is readily seen that the kind of special technical training would vary, as it was applicable to a manufacturing, a farming, or a mining community. Indeed, this has already been exemplified in a marked degree in the different developments of the schools of science in the several States, adapting themselves in their chief courses of instruction to the industrial demands of their localities. So we may hope to have in the art future of this country, as have the different European countries, art capitals famous for their peculiar developments, and queening it over their own states, as do Dresden and Munich and Florence, and the other famous homes of art. San Francisco, St. Louis, Cincinnati, Chicago, Cleveland, Pittsburg, Philadelphia, New York, Boston, New Haven, Worcester, and many other prosperous cities and towns may become in time great centres of beauty as well as of commerce, each having its own special development, varying in architecture according to the building material most conveniently accessible, and in art production and artistic manufactures according to their special industries and resources; but all alike affording to their children thorough technical training, and all attractive, because, everywhere, the eye rests on noble buildings; when the homes of industry shall also be homes of beauty, and to walk through the city streets shall be of itself an art education, as of old in Athens, as it was in many a mediæval town, and is still in many an ancient city of France, Germany, Italy, and Spain.

Drawing is the very alphabet of art (for art is but a language), the one essential requisite preliminary to any artistic or technical training; and, if it is desirable that the children of the public schools shall be fitted to become, if they wish it, skilled workmen in any branch of industry, it is necessary that they shall be taught to draw correctly. To those to whom art means higher things, as they suppose, than its application to everyday utensils and mere manufactures; who look for grand galleries of pictures and statues, and to all the higher refinements of cultured art, it may be a suggestive reflection that, among a people ignorant of drawing, and whose daily surroundings, as is true of most of the American people, afford few suggestions of art in any of its forms, high art must ever remain an exotic, and native artists be rarer than the fabled phoenix. A country's art, like all its other developments, must be based primarily upon the characteristics of its people. Where all are judges of art, great artists arise, just as great warriors among nations of soldiers, so that until the common people know the language of art, and can comprehend the meaning of line and color and form, the artist is as much out of place and as little to be looked for as a great author would be among a people ignorant of reading.

Nor has it ever been otherwise. The history of art is the history of peoples. Nor is there anything little or common in the eyes of art. The people that produced great buildings, fine paintings, and noble statues, had also the most exquisite household utensils. Their commonest articles, whose fragile beauty has outlasted the centuries, to-day, with subtle grace and perfect form, tease the eye of the artist and challenge in vain our most skilled artisans to reproduce them. The antique eastern dish of burned clay is held by the modern connoisseur as of more worth than its weight in silver; yet it was once in as humble and universal use as the commonest crockery of our kitchens. Great collections, museums, art galleries, much as they may contribute to the self-satisfaction of cliques and cities, will be of the slightest possible value and barren of results, either upon the industries of the people or their art culture, so long as drawing is not generally understood. Whoever succeeds in having all the public school children of the country properly trained in elementary drawing will have done more to advance the manufactures of the country, and more to make possible the art culture of the people, than could be accomplished by the establishment of a hundred art museums without this training. Just as libraries are worthless to those who cannot read, so are art collections to those who cannot comprehend them; just as all literature is open to him who has learned to read, so is all art to him who has learned to draw, whose eye has been trained to see, and his fingers made facile to execute. We have begun at the wrong end; we asked for art galleries when we needed drawing schools. But the evil is not irremediable. Let drawing be generally taught, and our art galleries and museums, poor as they are, will at once grow more and more valuable, for they will then begin to be of use.

The legislature of Massachusetts, moved thereto by

ART EDUCATION

the persistent efforts of a few cultured and public spirited citizens, who realized the imperative need and demand for such training in the public schools, passed an act in 1870 making drawing one of the studies of the public schools, and also making the establishment of free drawing classes for adults obligatory upon all towns and cities containing over ten thousand inhabitants. In pursuance of this law, Mr. Walter Smith, "art master, London, late head master of the Leeds school of art and science and training school for art teachers," was invited, both by the city of Boston and by the State of Massachusetts, to come from England and introduce the new study into the schools of the city and of the commonwealth. Mr. Smith was highly recommended by the Kensington school authorities. He was appointed state director of art education, and was unremitting in his efforts to introduce drawing into the public schools, and to foster the establishment of classes for adults. Mr. Smith was also appointed general supervisor of art in the Boston schools. He published, in 1872, a large illustrated work upon art education, which is indispensable to a thorough investigation of the subject, and will be found full of practical suggestions to those wishing to introduce the study into the schools.

It is only necessary for the American people to be convinced that a want exists to cause them to supply it. Believing the lack of provision for industrial and general art training in our present system of public education to be such a want, I have sought to show—

First. The need of preliminary instruction in drawing, its utility, and the practicability of its introduction into all grades of the public schools.

Secondly. What steps have been taken toward introducing it and how it can best be done.

Thirdly: The present condition of the means for industrial art training in technical schools, including the schools of science.

Fourthly: The means possessed by our higher institutions of learning for giving general knowledge of art.

Fifthly: The special schools existing for training professional artists.

Sixthly: The steps that have been taken for founding great art museums in connection with art-training schools.

We find that in one State, Massachusetts, drawing has been by law introduced into all the public schools, and a state normal art school established, that in many cities and towns in other States drawing has been more or less taught in the public schools; that in all the "schools of science," where engineering is taught, mechanical drawing is of necessity taught. In schools for the practical teaching of art, as applied to industry and manufactures, the free industrial classes for adults in Massachusetts, the Lowell Free School of Industrial Design at the Boston Institute of Technology, the schools of Cooper Union, the Philadelphia School of Design for Women, and the School of Design of the University of Cincinnati complete the short list. For the special training of artists we have the schools of the National Academy of Design, New York, the Yale School of Fine Arts, New Haven, and the new college of fine arts in the Syracuse University, which comprise all at present existing. The San Francisco school is soon to open. The school of the Pennsylvania Academy of Fine Arts will resume active operations on the completion of the new building. Of the colleges possessing any special collections or facilities for giving any instruction in art, even the most general, we find, excepting Yale and Syracuse, with their special art departments, only Harvard, University of Michigan, Cornell, Rochester University, the College of Notre Dame and Vassar College, out of the hundreds of colleges of the country, that either give any art training or possess any art collection, however small or incomplete.

There remain, then, but the public art institutions which we have already described; there are four of these in the whole land: at Boston, New York, Washington, and San Francisco. The Metropolitan Museum of New York, the Brooklyn Art Association, the Boston Art Museum, the Corcoran Art Gallery, and the Art Association of San Francisco are admirable instances of the methods by which communities and individuals in this country voluntarily provide those institutions for which, in other lands, the government alone is looked to. An important means of art culture, and the only one which has appealed to the general public, is found in the public art exhibitions. To those of the Metropolitan Museum, National Academy, the Boston Athenæum, the Yale Art School, the San Francisco Art Association, and the permanent exhibitions of the Corcoran Art Gallery, I have already referred. It would not be difficult to obtain collections of fresh works of the artists for exhibition and sale in connection with the loan exhibitions of works of art belonging to citizens that have been already suggested. The popularity of exhibitions of good pictures, as attested by the throngs of visitors that attend them and the

crowds that visit the salons of the leading picture dealers in the large cities, who hold perpetual exhibitions in a small way, sufficiently shows the public interest. In art. Indeed, with the multiplicity of American tourists in Europe in these days, it would be strange if the love was not awakened. There are quite a number of well-known private art collections in the leading cities which, separately, would make a desirable public gallery, and from which, as the Metropolitan museum has shown, a loan collection of rare works can be made for public exhibition.

While I have recorded the paucity of institutions capable of giving a thorough art training and the few public art collections now in this country, it is, nevertheless, apparent that there already exists in all the leading cities the material which needs only to be made available, to afford all necessary facilities for general and technical art training, and if it shall be undertaken in earnest, there is possible in this country a development, both in industrial art and in what are called the higher branches of art, which, at the end of 25 years will render obsolete the verdict passed upon us at the World's Fair in 1851 and never yet reversed. Here there is opened a field of honorable rivalry between the several States, cities, and towns of the Union. What England has done in this direction we can do, and the more readily that we have the advantage of her experience. No time or force need be wasted. We have but to adopt and modify the methods so thoroughly tested there to the different conditions that may exist in our several communities. I commend this subject of the relation of art to education to the consideration not only of all educators, but to all who are interested in the varied manufacturing industries of our many States. Skill is the modern secret of success. Science becomes ever more certainly the measure of prosperity. Science underlies and must precede art, it is the strong substructure upon whose fixed foundations she builds her palace walls. In the common schools the children of America must be trained to draw if her artisans are to hold their own in the world's contest, and if her artists are to enshrine her history. If they but will it, the "republic of the people" shall become the home of an art as noble and as enduring as that which glorified the "republic of princes," whose palaces for so many centuries have lifted their stately walls above the waves, guarding for mankind, not the trophies of her warriors nor the wealth of her merchants, but the priceless work of her humbler artists. Tintoretto, Titian, and Veronese are still fresh in men's memories, though the names of doge and patrician have faded from recollection.

In the tables of statistics of "museums of art and archaeology for 1873," given in the circular, there were but 13 institutions in all. Of these the two since reckoned among those having the leading art collections of the country, were but at the beginning of their history. The Corcoran Art Gallery of Washington, D. C., founded in 1869 by the late W. W. Corcoran, Esq., and by him richly endowed, had about 100 paintings, mostly the private collection of the founder, and a collection of nearly 200 casts of antique sculpture. The Metropolitan Museum of Art of New York, founded in 1870, by a few citizens, lovers of art, had but a small endowment, contributed by citizens, and had, in its first modest home down town, as the nucleus of the magnificent and varied collections which now, in 1899, crowd the stately halls and galleries of its majestic palace in Central Park, the Cesnola collection of Cyprian sculptures, ceramics, and glass, and a small collection of paintings, the latter mostly loaned.

In the 25 pages of statistics of art institutions for 1881-2, given in Part I of the special report, are recorded 37 "institutions affording art instruction, including all training in industrial art," and 30 "museums of art." Of these 37 schools, 24 were established in, or since 1869, and of the 30 museums 14 had like dates of foundation. These statistics show the unusual activity then existing in the art development of the people, nor has this ceased; new art institutions are being opened from time to time, either founded by liberal individuals, or by the community, and continual and important additions are constantly being made to the art collections of the several institutions.

The development of popular interest in the new features of education, from 1870 to the opening of the Centennial in 1876, was very rapid, and its progress immediately following the Centennial was surprising in its universality. Up to the time of the Centennial there were, in the United States, literally no books on artistic industries, and few on the fine arts, either published in this country or to be found in the ordinary public libraries. In view of the present abundance here of this class of literature, native and foreign, this statement seems almost incredible; it is, however, strictly accurate. Save occasionally in

ART EDUCATION

three or four of the older cities, there was in the United States, during the first half of the 19th century, little public opportunity for seeing any works of art so that, on the part of the people generally throughout the land, there was neither knowledge of, nor interest in, anything relating to art. The world exhibitions at the centennial first revealed to the great mass of American visitors the wonderful attractiveness and power of art, in creating and shaping the industries of the world. The wide-reaching influence of this world-view upon American educational and industrial development, thus effected by the Centennial of 1876, can hardly be exaggerated. Its beneficent results were charmingly illustrated throughout the Columbian exposition in Chicago, in 1892-3.

In fact, the great eras of that triumphant progress of modern civilization which characterizes our present century, are marked by the splendid milestones of the "World's Fair," beginning with the one set up in London in 1851. A "straw," showing the wide-spreading interest in all matters relating to art, now existing in this country, in marked contrast with the absence of such interest before 1870, may be seen in the fact that in 1899 a book is issued by 'The Macmillan Company, publishers, New York and London,' which gives for the United States and Canada similar information concerning art matters and artists to that which has long been given for Great Britain in their English issue, entitled 'The Year's Art'—a directory of all art schools, museums, etc. The American volume is a handsome, well-printed book, illustrated with 52 full-page reproductions of the works of living artists. The varied contents of this work, when contrasted with the few pages of statistics in the circular of education of 1874, give more striking evidence of the general diffusion of knowledge of and interest in matters relating to art throughout the United States than could be given by many pages of mere description. I have been glad to avail myself of the statistics gathered by Miss Levy, editor of the volume just referred to, showing, as they do, the continued growth and prosperity of the public art institutions. For the 30 "museums of art," as given in the art and industry report statistics for 1881-2, Miss Levy shows, as existing in 1898, 41 "art galleries," an increase of 11, while for the 37 art schools of 1882 Miss Levy records 117. She also gives a total of 159 art societies in the United States and 9 in Canada. No such societies were recorded in the special report. Reference to the United States bureau statistics, as given in the preceding pages, show a notable increase in art collections and schools from 1869 to 1882. The statistics, as now given by Miss Levy for 1898, show most emphatically that the interest in art education and in public collections of the fine arts, as contrasted with that shown by the earlier statistics, is still a growing and continuing interest. The good seed planted in Boston in 1870 has brought an abundant harvest!

Movement for Manual Training—This movement which was so suddenly developed had its immediate origin in the demonstration given by the successful introduction of the new study of drawing in the public schools, showing conclusively that it was feasible to teach at one time, a single subject to a large number of pupils.

The following immediate paragraphs are taken from the opening pages of the introduction to "Part I. of the art and industry report," published in 1885, by the present writer, in which the history of the introduction of industrial drawing in the educational systems of the country is given in detail:

"One of the most striking and significant results of the experiment, begun in Boston in 1870, by the teaching of industrial drawing to the public school children of that city, has been the widespread interest awakened throughout the United States in the further development of the industrial training of children. No sooner was it shown that it was possible to give to the children in the public schools, some elementary training of the hands and eyes, than a movement began in many places, to teach actual trades and handicrafts to the children while in school. Though there might be danger that overzealous promoters of this so-called 'practical education' would in their earnestness, overstep the true province of education, overstrain childish muscles, and overtax the mental as well as bodily strength of the growing children, still the public good sense may be trusted to restrain and modify such extremes; while the intellectual activity, which has been aroused and stimulated by this new departure in education, if wisely directed into practicable channels, can hardly fail of accomplishing desirable results.

"It is referred to here only as one evidence of the rapid progress of the 'evolution' of the principle embodied in the introduction of industrial drawing into the elementary public schools of the country. The practical bearing of this study upon the industries of

the country, is shown in the tendency to begin the technical training of the future workman or workwoman, at a far earlier age than had been before thought practicable. The danger, as already suggested, lies in not recognizing the limitations set by nature. While the kindergarten method avails itself of the natural curiosity and wonderful activity of very young children, and in its educational processes closely follows the leadings of nature; the attempt to teach handicrafts to young boys may very easily go contrary to nature, by imposing tasks unfit for untrained minds and undeveloped muscles. No such objection can, however, be against the study of industrial drawing. Weak indeed must be the hand that cannot lift a pencil, weaker the mind that, beginning at the beginning, cannot follow the graded and orderly steps, by which Walter Smith, basing his teaching on the everlasting truths of geometry, has arranged his progressive studies.

"When the study of drawing is regarded in all public schools as of the same importance as the study of reading and spelling, and as much time in the week is given to teaching drawing, as is given to either of these studies—which has nowhere yet been done, for even in Boston this study has been admitted largely on 'sufferance'—then, judging from the results already secured, it is reasonable to anticipate an increase in the numbers, as well as superior expertness in the skill of American-born workmen. It is by reason of its direct bearing upon the development of skilled labor that this subject of the introduction of the study of elementary drawing based on geometry, and with a direct view to its application to industries, is of the national and general importance which seems to justify the preparation and publication of the present report. Accounts of the experiments in introducing 'manual training' in the public schools, as well as the reports of the special schools for such training and of the technical industrial schools will be found in their appropriate connection in Part II. of this report. The passage by Congress of the law establishing the 'colleges of agriculture and the mechanic arts' as long ago as 1862, is proof that the need of some form of educational training, other than the purely literary courses which then comprised all that was given in the higher schools and colleges, was widely recognized.

"A knowledge of drawing is so essential to any progress in many of the studies comprised in the regular courses of the schools of science that, in view of the almost total neglect at that time of this study in the public, or private elementary schools, it is little wonder that when the new colleges, created by the national land grant act, were first opened, there were frequent complaints that, for want of this indispensable preliminary training in the element of drawing, nearly a year's time was lost in teaching the pupils that which should have been taught in the primary schools. While there were doubtless other studies in which a lack of suitable training was observed, drawing was both the most important of these preliminary studies, and the one in which deficiency was most common and most disastrous. It is because this knowledge is indispensable as a preparation for the courses in the schools of science, that the teaching of the study of drawing in all the public schools of the country is of importance to the colleges created by the national land grant of 1862, and it is in this connection that one element of the practical value and importance of this training of the public school children in elementary drawing can be readily seen. The public schools are the academies that fit the students for the national agricultural colleges, and, therefore, it is of importance to these colleges that the studies taught in the public schools shall be such as are preparatory to their own courses of study."

The origin of the educational form of manual training, as introduced in the public schools of the United States, and as presented in the technical and manual training schools, is by some definitely assigned to the year 1876 as being the direct outcome of the object lessons of the "work in metals," shown by the Stroganoff school in the Russian exhibition at the Centennial. The work of this Russian school was enthusiastically set forth to educators by Prof. Runkle of the Boston Institute of Technology, and by Prof. Woodward, since director of the Manual Training School of St. Louis. Several other educators, interested in industrial education, as shown in the exposition by the work in wood in the Swedish department and by other like experi-

ART EDUCATION

ments, heartily favored the movement. This movement is, in the opinion of the writer, simply the logical outcome of the experiment of introducing instruction in industrial art drawing in the public schools, initiated by the calling of Walter Smith to Massachusetts in 1870. It is, therefore, germane to the purpose of the report, although not solely artistic in its present development.

Drawing in American Schools.—The beginning of the modern art educational movement in the United States can be definitely assigned to the year 1870. By a melancholy coincidence which groups the termination of the lives of the three remarkable men by whom this great educational reformation was begun, within a few short months of each other, the close of the first period of this movement, destined to exert immeasurable influence over the future of America, can be fixed as in 1886. In common with Dr. Philbrick and Mr. Perkins, Prof. Smith regarded the introduction of industrial art drawing in the schools as but the beginning of the movement for the industrial art education of the American people, as his published addresses testify. The great movement in the United States which these three men definitely organized, and of the development of which they had a far-sighted, comprehensive view, may be said to have already fairly entered upon the second period of its development, no longer by any means confined to the public schools. It is because all training in industrial education that can be given in the public schools as they now exist, or in any new class of schools that may be established with that direct purpose, must, of necessity, be based on the thorough grounding of the pupils in the knowledge and practice of elementary industrial art drawing, of like character with that first successfully taught in the public schools of Massachusetts under the directorship of Prof. Walter Smith, that the present widespread movement is termed a second step in the new educational advance.

What these three men in Massachusetts did was to demonstrate beyond cavil, that it is as possible in the same time to teach a subject, by means of drawings and objects shown and explained by a teacher to a class, to many pupils simultaneously, as it is to teach the same thing to a single pupil. The effect of this discovery was at once to multiply indefinitely the power and capacity of the public school. For not only was this true of instruction in drawing and in writing, the studies which before had been thought to need particular devotion of the teacher to the individual pupil, but it was found applicable to many other studies and to afford great facilities to teachers in illustrating many topics.

If industrial art drawing had no other value than to have furnished this proof of the facility of general instruction to classes, instead of to individual pupils, it would have fully justified all the cost of its introduction in the schools in money, time, and effort. Much besides this was effected by the proof that the study of industrial art drawing demanded no special faculty on the part of either pupil or teacher, but could be taught to all by the regular teachers of the schools after a little preliminary training of the teachers themselves in classes. It was long before the popular impression that drawing merely meant picture-making, and that the ability to

draw was a special gift of genius, could be corrected; but this was gradually effected by repeated public exhibitions of the work done by all the pupils of a school, or of all the schools of a town or city, where it was shown that every child whose eyes and fingers were uninjured could learn to draw. The object of the study, which was to train the eye and the hand—the one to accuracy of seeing, the other to facility of execution and exactness of statement—began slowly to be understood. The value of a thorough training in industrial art drawing has at last become so generally recognized as to call for little argument. It is taken for granted in the discussions about the further development of industrial education that the pupils have been taught the elements of drawing, just as, in discussions about new text-books, their ability to read is assumed. It was far otherwise in the beginning. All through the early years of the decade, from 1870 to 1880, there were very few individuals, and fewer school officials in cities and towns, who were in the least aware of the usefulness of this study. The very places in which the most zealous advocacy for manual training in schools, and for the adoption of all forms of industrial education is now found, were only, after long-continued efforts, led to allow the experiment of teaching drawing in their public schools to be tried. However, the Centennial exhibition in Philadelphia in 1876 worked wonders in the general diffusion of a knowledge of the possible value of this industrial art education; for the American people then first saw into how large a share of the manufactures and arts of mankind this application of art to material enters; first learned how values were enhanced by art, and began to realize how art ennobles labor.

They saw also at Philadelphia, in the collections shown there of the industrial art drawings made by the school children of Massachusetts, by what methods, and with what results, the teaching of this new study could be effected. More than this, the pupils' work in applied mechanics, shown by the Russian schools, illustrating the results of giving definite instruction, in a systematic course to artisans, was there first seen and the idea of the "manual training school," since so admirably exemplified in the St. Louis and the Boston schools, modeled after the Russian plan, was familiarized to American educators. Thus, the sure foundation for a further advance in the development of industrial education was laid.

As soon as the success of this attempt to begin the elementary training of the eye and hand in the public schools was satisfactorily established, it was evident that a new and valuable means of education had come into use. Educators eagerly adopted and experimented with the new methods, some looking at them only with a view to their application in the art of teaching their pedagogic value; others, the majority, seeing in them the means of giving a more directly practical turn to the training in the public schools. The demand for this more practical education has been rapidly growing, and in these new studies were found the first practical suggestions for so modifying the old methods of school education as to adapt them to the new demands. In common with all germinal ideas, they were found capable of various applications and of indefinite development. It

ART EDUCATION

was the recognition of this potentiality that led Dr. Philbrick and Mr. Perkins to desire and secure their introduction. When it is seen how truly the present interest in industrial training is the legitimate result of the introduction of industrial art drawing in the public schools of Massachusetts, and that, but for this pioneer work in thus clearing the way, and laying the sure beginnings of general technical training in this country, the great Philadelphia exhibition must have failed of any direct practical bearing upon our education, or our industries, other than to greatly stimulate the buying of foreign art manufactures; the magnitude of the services rendered to the whole country by the three men who originated the plan and effected the introduction of the practical study of industrial art drawing in the common schools of Massachusetts in 1870, begins to assume larger and grander proportions. That the practical value to the people of the United States of the opportunities afforded by the splendid displays of their art industries by the nations of the world at Philadelphia, was greatly enhanced owing to the direct interest in industrial art training, begun in Boston six years before and rapidly developing in Cincinnati, St. Louis, and elsewhere, may safely be assumed; because the industrial value to a people of the sight of such varied museum collections as were shown at the Centennial, is not mainly derived from the pleasure given to the mere sight-seer, but is owing to the opportunities thus afforded to practical designers and artificers for thorough study of the works shown; for, as Emerson sagely says, "No matter how much facility of idle seeing a man has, the step from knowing to doing is rarely taken." It was in this exhibition that the utility of such training in the artistic industries was first made known to large numbers of Americans; it was here, also, that the methods of successful teaching in the elements of these arts were first shown to the whole country. It is of interest thus to be able, sometimes, as in this instance, to trace great results to their causes.

This movement was the true dawn of the new era of the industrial art development of America, which was apparently ushered in by the Centennial exhibition; nor, if the movement, which has gone steadily forward from those early days in Boston, meets with no unforeseen interruption, will the term "era" seem inappropriate. That the purpose of the early promoters of the introduction of the teaching of drawing in the public schools of the country was to develop and promote the knowledge and love of art throughout the community may be inferred from the fact that, in the same year that Walter Smith, himself a sculptor by profession, was brought to Boston, Mr. Charles C. Perkins,—at whose suggestion some two years before the American Social Science Association had sent to Europe for a number of casts of classical statues and busts to be placed in the new building of "The Newton Street Girls' High School,"—superintended the placing of these works of high art in position; the architect having provided for them in his plans. The purpose of this collection was two-fold, both to provide fitting decoration for the building, and "as a simple but efficient means of introducing an aesthetic element into the educational system of the United States," by offering to the pupils an opportunity to see and comprehend some of the works of the great

masters of art. With this intent, Mr. Perkins, himself an acknowledged authority on all matters relating to this subject, gave to the fortunate pupils of that school a series of lectures on classic art as exemplified by the works before them. This collection comprised casts of 10 famous antique statues and 11 busts. In addition to these single examples a portion of the wonderful frieze by Phidias, from the Parthenon, was put in place on the walls. The Museum of Fine Arts, though incorporated in this year of 1870, was not opened for several years; so that the casts of the girls' high school collection comprised the most of the works of classic art then accessible to the public in the city.

This, then, seems to have been the first instance in this country of the definite undertaking of the artistic adornment of the interior of school buildings, though for many a year, here and there, in some wayside country school-house, a few wild flowers, or garden posies, brought by some loving scholar to the youthful teacher, and set in honor upon her desk for all to see, had given unwonted charm and color to the dingy room, with unconscious suggestion of the beauty waiting to transform, at a touch of the magic wand of art, those too often repellant dens of ugliness, the common school rooms of the country, with their desolate, naked walls, into bright, attractive homes for the happy children; such as are to be found to-day in city and town, and along country hillside all over the land.

As the origin of the present somewhat widely extended movement for beautifying the school rooms, has been attributed solely to the movements begun in France and in England a decade later (see report of Boston school committee on drawing and music for 1883) — it has seemed well to refer here to the inauguration in 1870, of this earlier Boston idea of placing examples of antique art in the school. (For a full account of this Boston experiment, and of other later similar efforts elsewhere, as well as for several papers of interest in this connection, see chapter I of Part II. 'Art and Industry Report,' pages 1-11 of Appendix 'K,' Part II., pages 709-731.) Mr. Perkins and his associates sought to give to the young girls, many of them about to become teachers in their turn, some definite knowledge of classic art, so that not only should they see for themselves these objects of ideal beauty, but that all literature should be thus for them illumined—since the literature both of Europe and America springs so largely from that of Greece and Rome. The cost of such a collection of casts of ancient art would preclude any such undertaking in most schools, public or private, but fortunately beauty is not to be held a captive, even in golden chains, and, just as the cheaper plaster casts, as in this instance, take the place of costly marbles and bronzes, so engravings and photographs afford admirable and inexpensive reproductions of plastic and pictorial art; while in our large cities are now publishers who make a specialty of providing such artistic illustrations for the use of students, or for the adornment of the study walls, and the halls, and assembly rooms of the schools, adapted to all needs and to all purses. However, unless the living teacher shall bid these dry bones of art to live, shall unseal the closed eyes of the children so that they can recognize their beauty, and shall awaken their eager curiosity to learn the

ART EDUCATION

meaning and the message of these silent ministers of art, they will fail of their mission.

The initial movement in Boston, in 1870, for artistic adornment of school rooms, as well as for the art instruction of pupils, was soon followed by similar undertakings in some of the neighboring towns and cities of Massachusetts; and later when the English and French movements became generally known, in many places all over the country. In New York, Brooklyn, Providence, New Haven, Philadelphia, Chicago, Milwaukee, Denver, San Francisco, and doubtless in many other cities the movement has made good progress. Long since, in Baltimore, in the Maryland Normal School building, under Supt. Newell, and in Washington, D. C., in the Franklin School building and the high school building, under Supt. Wilson, many artistic works had been placed in the halls and school rooms, which are constantly added to, under the supervision of their successors. In Boston, in November, 1894, and was held under the auspices of "The Public School Art League," "The New England Conferences of Educational Workers" and "The Boston Art Students' Association," a fine exhibition of works suitable for school-house decoration, and in Brooklyn, N. Y., in the spring of 1896, a similar exhibition in charge of the art education section of "The Brooklyn Institute of Arts and Sciences." This direct outcome of the movement for industrial art training in all public schools, and inspired by the same leaders, may serve to show that the art idea was ever in the plan of the founders of this important movement, which, unfortunately for awhile, was in great danger of being wholly divorced from any idea of art.

The Boston movement for putting the study of drawing into the regular curriculum of the public schools attracted the attention of educators all over the country, and during his first year in Boston Prof. Smith was invited to attend the convention of State school superintendents held in Washington, to explain the nature and purpose of the innovation of which he was in charge. The strong personality of the man impressed all who listened to his impassioned pleadings and aroused a contagious enthusiasm, so that even before the showing of results at the Centennial in 1876, the fundamental principles of the movement were well known throughout the educational centres of the public school system of the several States of the Union.

This failure of the art idea in the manual training schools is so evident that some of those who started enthusiastically with the industrial art drawing movement, but were led away by the more sudden popularity of the industrial training movement to the hearty indorsement and support of the latter, begin to realize the evil they have helped to bring upon the most hopeful educational movement ever begun in these United States, and feebly point to a single manual training school in which—thanks to the fact that the superintendent of that city was one thoroughly in touch with Walter Smith, and had mastered the underlying principles of art training which inspired the teachings of that great master—some reachings out for æsthetic culture are indicated, as the ground for their hope that in the future art training in manual training schools "must come as a necessity!" So, for

ages, men have pointed forward to some anticipated millennium!

Neither in the theories, wishes or methods of the people who most actively advocate the manual training movement can the present writer see promise of any valuable development or training of the æsthetic nature of the public school children of the United States.

"The 'industrial training' and 'manual training school' advocates are entitled to much credit for what they have accomplished, and there is much of value in the work they seek to do; but there is no evidence that they comprehend, or desire, any such art training as Messrs. Philbrick, Perkins, Smith, and their wise and enthusiastic coadjutors hoped to add to the educational forces of America.

"Had these three men been spared to instruct and to inspire, it seems possible that the hopes they aroused might have met fruition.

"The prolonged study of these schools, as well as of the arguments of manual training advocates, incident to the preparation of this volume, has led to the reluctant conclusion that, however desirable the development of art among the American people may be, no such development is directly, or indirectly, to be anticipated from the efforts of the advocates of industrial education; while the methods of the manual training schools are, of necessity, mostly occupied with the kind of drawing specially adapted to mechanical processes."

As stated, the general awakening of interest in the educational industrial possibilities caused by the rapid extension of the movement for the adoption of drawing as one of the required studies in all public elementary schools, had a marked tendency to eliminate the art idea. So little was the knowledge of, or interest in, art in any community, that the first advocates of drawing, though, as has here been clearly indicated, they valued the study chiefly for its relation to the arts, spoke to the public mostly of the industrial value of drawing, seeking thereby to recommend the new study. The enthusiastic efforts of the advocates of drawing, the remarkable personal influence of Prof. Walter Smith, the showing made at the Centennial exposition of the successful work of the students of the Boston Normal Art School, and of the work of the Boston school children, gave a great impetus to the development and spread of the industrial art movement throughout the country, so that it seemed to be on the point of complete success, and of being adopted in all the public schools of the States. Suddenly, however, a change came. After 12 years of devotion to his important work of supervision, Mr. Smith resigned as art director of the State, as principal of the Normal Art School, and as in charge of the art training of the Boston public schools, and returned to England. The marked change that followed in the direction of the educational movement from industrial art training to manual training and the teaching of trades, was doubtless due somewhat to the general indifference to art felt by a large part of the public; but, more largely, to the failure of intelligent support of the art ideal, due in part, as suggested, to the return of Walter Smith to England—driven out by antagonisms, but in a greater degree to the almost simultaneous removal by death of the able early

ART EDUCATION

promoters of an art purpose in the study. To the concurrence of these lamentable events may fairly be attributed the almost total eclipse of any art idea in the study of drawing which for a time prevailed. At this period the purpose which inspired the early promoters of the new study of drawing seemed hopelessly lost in the new-born zeal for mechanical drawing as relating only to "manual training"—to making things; and to the preposterous, though popular idea of graduating from the public schools boys of 14 and 18 years of age as thoroughly trained expert mechanics. The simplest principles of educational and technical industrial standards are alike violated by such claims and endeavors. The claim that the simple mechanical processes can be taught; some knowledge of the use of tools acquired, and much given that will serve to prepare the boy for the subsequent technical training which is essential to his success, but suitable only to one of added years and maturer physical development, is perfectly tenable; so that manual training, as elementary preparation for the technical study of future life-work, or, as giving some desirable general knowledge of mechanics, is to be warmly commended and encouraged, but it is not to be taught as antagonistic to the elementary instruction in drawing, the alphabet of art as well as of mechanics. It is an evidence of the common sense of the community that such waves of feverish interest in educational experiments are but of short duration. Inevitably somewhat later the new study, which at first was to revolutionize all former educational theories and methods, gravitates to its proper place in the general scheme of education, according to its proved relative importance. So, within the past few years, a reaction has come in connection with the public schools, and the art quality of drawing is again recognized. It is to be hoped that the essential difference between the educational value of a study as a method of developing and stimulating the intellect, and that simple iteration of thought and movement, essential to the production of technical facility in mechanical operations, will not again be lost sight of by the educators or the public.

In 1870 it was evident to all intelligent observers that the one element absolutely lacking in all American education was the æsthetic. Art as an essential feature of education was unknown. It is true that the literary arts, poetry and oratory, received some little attention in the higher institutions, and that instruction in elementary music was not wholly neglected in the public schools; but, so far from any attempt to give even the most cursory knowledge of the graphic and plastic arts, being made generally in the higher educational institutions of the country, they were simply ignored, while æsthetics were only thought of as forming a subordinate branch of metaphysics. This absence of any knowledge of, or training in, the fine arts, held true in all American public educational institutions, from the district school to the college. There were then no true universities, though several small but ambitious colleges were encumbered by the grandiose title. While this statement as to the absence of any general opportunity for seeing examples of the fine arts, and as to the lack of any attempt to give a knowledge of the arts of painting and sculpture in the public schools and other public edu-

cational institutions in the United States is not exaggerated, it is nevertheless true that the fine arts were not wholly ignored in America, and that, as early as the latter part of the 18th century, the names of some few American artists were known to the world, while early in the present century efforts were made by a few people of culture to establish art centres in several of our cities. Facts relating to the early history of these sporadic efforts to form art academies and public art collections, have been most eagerly sought and collected for educational department reports. These interesting histories will be given in Parts V. and VI. of Art report. In view of the later developments, especially of the growing general interest in, and knowledge of, art matters since the beginning of the movement in Boston for teaching elementary drawing in the public schools, and the vastly greater impulse to public interest in everything pertaining to art, given in turn by the holding of the Centennial and the Columbian expositions, the story of these early efforts acquires added interest. To the self-denying efforts of a few artists and art enthusiasts were suddenly added the enthusiasm and the active support of an awakened public.

In view of the many collections of casts of antique sculpture, and of the private and public art galleries, rich in examples of the work of the leading modern artists of Europe and America, which, as the result of this "awakening," are to be found in the United States in the year 1898, and of the special art classes and art schools now in our cities, with the very general interest shown in the literature of the arts; and further, in view of the present easy access by the public to the before-mentioned art collections, the statement concerning the scarcity in America, as recently as in 1870, of similar opportunities, would seem almost incredible. It is, nevertheless, the fact that, at that date, there were but four or five small collections of casts of classic sculpture in the whole country. Boston, New Haven, New York, Philadelphia, and Washington, had each a few examples of such casts; but all the casts of sculpture then in the country, both in public and private possession, would not equal in numbers or value, the casts now possessed by the leading art museum in any one of these cities; while in towns, cities, and colleges all over the land are to be found valuable and interesting collections of casts and paintings. There were then but eight colleges which gave any instruction whatever in art, or that had any collections of art works, while there were but five public art museums in the whole land. The Centennial exposition in Philadelphia, in 1876, was a revelation to the American people, not only of the glory of the graphic and plastic arts, as shown by the world's great living artists, sculptors, and painters; but also of the variety and beauty imparted to articles of usefulness and ornament by the wonderfully artistic weavers, potters, and metal-workers of the Orient, and by the skilled art workers of Europe. The increase of such opportunities since 1883, by the opening to the public of similar facilities for art culture, both by the founding of public art galleries, the making of private collections of art, and the general dissemination of information on all matters relating to the arts, by the press, and by lectures and addresses, have been no less remarkable, stimulated as all this

ART EDUCATION

interest has been by the holding of the exhibition in Chicago, in 1892-3; for, wonderful as were the revelations of the Centennial, to the public of 1876, the marvelous showing of the Columbian exhibition, or world's fair, at Chicago, in 1892-3, completely overshadowed them. In this latter exhibition of the world's industries and arts was shown not only the striking advances made since 1876 by all the world, in every field of human activity, knowledge, and enterprise, in art and industry; but also more impressively if possible,—at any rate more significant educationally,—than these myriad treasures from all the earth, was the revelation of the marvelous beauty of that white city by the inland sea; with its classic peristyle worthy of the Athens of Pericles and Phidias; its lofty pillared fronts and swelling domes—its vast palaces stretching in seeming endless procession. The beautiful transitory treasure houses America had built for the world's richest offerings! These stately structures—which filled every beholder with wonder and delight—proclaimed to the world that, in the intervening years following the Centennial, the young nation of the West had given birth to a race of great builders—architects, sculptors, painters, and decorators, worthy to rank with the world's worthiest. As the American architects had, as a body, early undertaken to secure thorough training in that art for the young men aspiring to enter their profession, this demonstration of the grand results of thorough artistic training in architecture and its kindred arts was in the nature of a triumphal verdict in favor of definite education—of special training—in art, as well as in science, or in the so-called "learned professions." Thus, while these temporary buildings by their variety, fitness, and beauty of proportion, won the admiration of all beholders, they were in fact but a great object lesson, illustrating on a gigantic scale what education in architecture, art, and artistic decoration could effect. The noble building of the Boston Public Library, since erected, and the stately marble palace of the National Library so recently opened in Washington, are enduring monuments, showing what the art of American architects, builders, sculptors, and painters can accomplish, in these closing years of the 19th century, in the construction and adornment of a great public library. The exterior walls and sculptures of the National Library, the interior halls and grand stairways, and above all the profusion, variety, and general excellence of the sculptured and pictorial art works enriching walls and ceilings within, remind us that we are, even now, in this 19th century, living in the years of that "renaissance" which did not pass away, as we once thought, with the passing of Angelo, Raphael, De Vinci, and their peers, but which is still vital with inspiration; so that here, on this to them unknown continent, opportunities are beginning for the future art masters of the world. When Hunt painted his two great allegorical pictures on the walls of the legislative chamber in the State capitol at Albany, that great artist "builded better than he knew," though, alas! his own work so quickly passes; for, by that single precedent, he opened up all wall spaces of public buildings to the future artists of America; so that hereafter, in this land, it shall be held—just as it was in Europe centuries ago—that the walls and ceilings of all

palaces, churches, and other public buildings are to be considered but as the durable canvas of the painters.

That "rebirth" of the past, which came with the discovery of a few of the art wonders of Greece, occurring almost simultaneously with the regaining of some of the intellectual glories of Greece and Rome, in the unearthing of a few manuscripts which gave to us moderns a glimpse of their glorious intellectual triumphs—as yet unsurpassed and seemingly unsurpassable—gave to our conception of the capacity of the human intellect a new ideal, and woke the world to life! What the wonders of the classic age, in art and literature must have been we can faintly imagine, contemplating the works of the intellectual and artistic giants of Italy in the Middle Ages, who sprang into being at the magic call of a few scattered fragments of the words and works of the mightier ancients; just as, in Holy Writ we are told the chance touch of the bones of the prophet Elisha woke the dead to life! So, to-day, as Homer, Æschylus, Demosthenes, Aristotle, and Plato, dominate the world of letters in poetry, eloquence, and philosophy, Phidias, Ictinus, Appelles, and their compeers, lead the worshippers of art.

In art, in our own day, have been repeated similar discoveries to those which in literature, four centuries ago, aroused to new activities the mind of Europe; for the revelations of Etruscan tombs, the patient explorations by Layard, Schliemann, and Di Cesnola, the unearthing of the terra cotta figurines in Tanagra, the later work by English and American enthusiastic scholars in Greece, in these very days, have brought home to us moderns a comprehension of the vitality of classic art; which, contrary to our earlier impressions, we now find to have been busied not only with the ideal images of the Olympian divinities, but also with the everyday life of the people, all testifying to the solidarity of the human race; for, quickened by the life-giving touch of their artists in those far-off centuries, the little figurines of the graceful maidens of Tanagra reveal, in their unconscious attitudes, the same love of dress, the same delight in free movement and flowing robes,—in short, the same irrepressible joy in life, and the same marvelous beauty of youth which meets us to-day on every hand, a-foot or a-wheel, in the blushing maidens of 16 years in this fair land, the unknown "ultima thule" of the ancients. So past and present meet and blend, taking no thought of the thousand intervening years. Here to-day, the thought, the art of Athens and Rome shape our thoughts and arts; so that we consciously or unconsciously are the children of that elder civilization. The most recent illustration of this influence of classic examples upon our modern American art ideals, to which reference has been made, occurs among the buildings of the exposition held in Nashville, Tenn., in the summer of 1897, where the crowning architectural charm is found in the striking restoration of the Parthenon of Athens, which is the model taken for the art building of the exposition. This reproduction is spoken of as full of grandeur and beauty.

It is also remarked that the government building erected for showing the governmental exhibits has, fortunately, been modeled after the Chicago exhibition art building; so that, instead of being externally, as was the one at Chicago,

ART EDUCATION

a hideous enormity, in contrast with the artistic buildings surrounding it, this copy in little of the beautiful construction designed by Richard M. Hunt for the art building of Chicago, is not out of harmony even when brought into contrast with the world-renowned *chef d'œuvre* of Ictinus and Phidias. This is all the more to be rejoiced in because it began to seem that, under the stress for room in our modern cities, all ideas of beauty in architecture must, perforce, be wholly subordinated to the frenzy of piling stories upon stories, till the builders seemed to have no ideal other than that of the Tower of Babel.

This epidemic of many-storied buildings has had a most unfortunate effect, in many instances, in degrading the architectural aspect of our older cities. Perhaps some of the most striking examples of this incidental evil, are to be found in the city of New York, where the ever beautiful old familiar landmark of Trinity church steeple has been eliminated from the once attractive view of the city as seen from the bay. In addition to this misfortune must be reckoned the recent belittling of that charming example of palace architecture, the New York city hall, formerly so well shown standing as it did in the ample open square given to it in the heart of the town, now, seeming as if at the bottom of some mountain valley, towered over by the clustering cliff-like business buildings that crowd about the square, shutting out all views save of their own precipitous walls. In Washington, an impertinent modern apartment house, towering in apparent emulation of the Washington monument, obtrudes its awkward outlines and gigantic bulk in every possible view of the capital city, once so beautiful as seen from every point of vantage and uglifies it all.

In some at least of the cities of Europe the observer can hardly fail to notice that, while the residences and business buildings in the streets of the city may make no pretense to any display of architecture—often being noticeable rather by reason of excessive plainness—care has been taken to secure for the public buildings of Church or State—the cathedral and the civic palace—ample space, where no private erections could ever destroy the harmony of proportion, or impair the true architectural effect of the building. In this country, notably in the very instance of the New York city hall, this effect was supposedly secured by the generation who built it only to be thrown away by a later generation of ignoble or careless successors. In the situation of the capitol building of the United States in Washington, D. C., and in those of the State capitol buildings in Albany, N. Y.; in Boston, Mass.; in Hartford, Conn.; in Nashville, Tenn., and in many another State capital, the sites are commanding.

The choice of the situation for the cathedral of St. John the Divine on Morningside Heights, New York, is most fortunate. It is architecturally isolated so that no such misfortune can affect it as has recently relegated Trinity Church and the city hall to comparative obscurity.

It is with this thought that the foregoing pages have been given to the brief summary of the recent remarkable development of the fine and decorative arts in connection with the forward movement in the architecture of public buildings, so strikingly illustrated in the recently erected library buildings in Boston and Wash-

ington. The Chicago Public Library, though on a smaller scale than the libraries at Washington and Boston, and in further contrast, making larger use of merely decorative marbles in wall surfaces than of the work of the artist painters, is nevertheless unmistakably of the Renaissance period.

The wonderful wealth in decorative carvings and grandiose stairways in the State capitol at Albany, suggests some of the undesirable features of the later renaissance, in which in the interiors, costliness of material and work, seemed to take the place of artistic inspiration; while the ostentatious piling up of costly stone exteriors, suffocated all efforts of living art. A heathen apotheosis of mere material wealth, against which Gothic art was a religious protest; and concerning which John Ruskin has so earnestly and eloquently warned the men of his own day. Coldly inhuman, these towering piles of quarried stone, frowning above our city streets, seem as menacing as hostile fortresses.

The grand marble stairway of the capitol building in Albany, designed by Richardson, and said to be the most beautiful and costly example of elaborate carved work in the country, which has taken more than 12 years in its construction, seems to repeat, in the lavish profusion of its carving, something of the extravagance of the later renaissance. It is due, however, to the architects of this great building, Messrs Fuller, Eidlitz, and H. H. Richardson, to state that its exterior in nowise recalls the characteristics of those ostentatious buildings referred to; while it is well to remember that, if anywhere profusion of art decoration is fitly employed, it is in enriching and dignifying the important public buildings designed for the uses of the people. In considering this particular people's palace, all who love art must ever remember that it was in this building, as has already been here stated, that William M. Hunt, the great painter, set to the American artists and builders of our time the striking lesson of noble art decoration so fortunately followed in the great public library buildings just completed.

In the zeal of this new awakening on the part of American architects and their employers to a practical recognition of the value of art in the decoration of the interior wall surfaces of public buildings—the most recent examples of which I have instanced—it should not be forgotten that, decades before these later buildings were planned, those who had charge of the construction of the grand building of the nation's capitol at Washington had freely availed themselves of the works of the American painters of their day, beginning as early as 1837, to illustrate memorable and pivotal events in the history of the republic; so that, on entering the grand rotunda, the visitors found themselves encircled by a series of large historical paintings, of a size in harmony with the colossal proportions of the encircling walls which supported the upspringing arches of the crowning dome; while in the dome itself, in a blaze of allegory, dear to the heart of Italy, was given the Italian artist's conception of the great powers essential to the prosperity of a people, and, though diplomatically disguised in appellation, a glimpse of the crowning triumph of the nation in its latest terrible struggle for existence. From the landing of Columbus to the coming of Lincoln,—

ART EDUCATION

he who runs may read in the paintings, the bas-reliefs, and the encircling frieze, "*in tempera*" — (though little can be said in praise of the artistic excellence of the reliefs and the frieze) — the dramatic events of the centuries which have resulted in giving to the world the republic of these United States of America.

Our legislators called not only on the painters, but also summoned the sculptors to the adornment of this, the chief building of their country; and gradually important works by Greenough, Powers, Crawford, and Rogers were secured. In addition to these works by native artists, the services of Italian artists (Bermudi and others), as decorators, were largely availed of in the dome, halls, galleries, and committee-rooms of the building; while in the wings, occupied, respectively, by the legislative chambers of the House of Representatives and the Senate, later American artists have added many fine works illustrating the history or the scenery of the country.

It has been a fashion with many writers, posing as art critics, to speak contemptuously of the historical paintings in the rotunda. However true their criticism may have been, if comparison of these paintings with the *chef d'œuvres* of the world's great artists — Titian, Tintoretto, Veronese, Velasquez, Rubens, and other great art masters in historical painting, either in their conception of the subject or mastery of technique, are concerned; it should not be forgotten, in endeavoring to estimate the value of this art work to the country, that a half century or more ago few American citizens who entered that building had ever before had the opportunity to look upon a fine work of art of any kind. It followed, therefore, that the sight of that grand rotunda, with its uplifting dome, its great paintings, was an event never to be forgotten; and the grandeur and inspiration of the scene gave to many their first realization of the meaning, the power, and the possibilities of art. There have been American artists, before and since these works were painted, who justly rank as artists far in advance of Trumbull (though few have left works which can surpass in brilliancy his small, jewel-like originals of these large paintings, long the pride of the Yale College Art Gallery), Weir, Chapman, Vanderlyn, and Powell, the painters of the works of the rotunda; but it may well be questioned whether, before 1870, any other American artists have given to so many of their fellow countrymen their first appreciation of something of the glory of art.

A debt of gratitude is due to the legislators who authorized and the artists who executed these works. Nor, taken as a whole, are the art adornments of this, the noblest legislative building in the world, inferior to those of similar modern public buildings in European countries. Art in the early part of the 19th century, so far as shown in statuary on the exterior of buildings, was in nowise generally superior to the grandiose sculptures by Persico, which stand in the east portico of the rotunda; while the group by Greenough is far superior to the ordinary statuary of that day. Nor in painting was Trumbull so greatly inferior to his master, West. In fact, the era of the reign of the fourth George of England, and his immediate successor, was nowhere in Europe memorable as illustrating the highest ideals of art. Early in this century

America had, in Allston and Stuart, art masters equal to their contemporaries of any other nation.

In view of this long-continued example of the possibilities of the artistic use of interior wall surfaces, as shown by the pictorial illustrations in the rotunda, of the history of the country, by well-known artists; and, also, by decorative paintings on minor wall spaces which adorn the interiors of the nation's capitol building; the fact of the almost entire absence throughout this period of similar wall paintings and decorations in other civic public buildings in the land, as well as in churches and private dwellings, so that the paintings by Hunt in the State house at Albany can be accurately designated as marking the definite beginning of the present era of the general artistic interior decoration of buildings, civic and religious, public and private; — furnishes a convincing proof of the utter lack, on the part of the American people as a whole, of any general knowledge and appreciation of the value of art in its application to the buildings, and the furnishings of life, prior to the holding of the Centennial exposition in Philadelphia in 1876.

It may well be urged that, up to that time, this busy people were too fully occupied in completing the physical conquest of a vast territory; in subduing forests, bridging streams and opening virgin prairies to cultivation; in providing for the transportation, housing, and feeding of the ever-surging incoming tides of eager emigrants; were in short too busy in their imperative task of *making* history to find time or thought for its artistic record. When at last they found time to pause and study the lessons of that Centennial, they proved apt students; as the Columbian exposition has shown. Yet notwithstanding this later surprising and artistic evolution of the American people, so widespread and rapid has been the development of technical training in its application to industrial and fine art manufactures throughout the leading countries of the continent of Europe, and also, though begun later, in Great Britain, that, although the development in elementary artistic training and its facilities for the acquisition of advanced instruction in these arts in the United States has been wonderfully increased since the beginning in Boston in 1870, of the movement for school instruction in drawing, and the holding of the Centennial exposition in Philadelphia in 1876; still, in the opportunities offered for the training of skilled youthful workers in the industries of applied art, the United States to-day — in view of the persistent efforts and great advances made during the past 20 years, by European countries in providing such educational facilities — are relatively hardly in any better position to contest successfully with the products of the trained workers of Europe than they were in 1870.

Nevertheless the efforts made in this country by leading educators, and by liberal patrons of artistic and technical education, have been notable and most worthy of honor; while the great advance since the Centennial, as shown in the art qualities of American manufactures, in jewelry, in glass, in art fabrics, in silk, in woolen and in cotton, as well as in architecture and in all material pertaining to the decorative arts, has been simply marvelous.

So far, also, as affording requisite oppor-

ART EDUCATION—ART OF POETRY

tunities for acquiring thorough training in the fine arts of painting, sculpture, and architecture, the few art schools in the United States compare most favorably with those of the older countries; so that it is no longer essential—though it may often be for other reasons desirable—for the ambitious young painter, sculptor, or architect, to exile himself in order to obtain needed opportunities for instruction in those several arts. Nor are our leading technical schools of science inferior in equipment or in quality of instruction to the similar schools in Europe. These schools in the United States are, however, so few in number in proportion to our increasing population as compared to the number and variety of those offered to the citizens of the leading art industrial European countries of Germany, Switzerland, Belgium, and France—not to mention Great Britain, Austria, Italy, and Russia—that the inadequacy in numbers of our schools for training the captains of industry, not to mention those merely technical trade schools designed for creating a force of trained workers, impresses itself painfully upon the investigator in these fields. With the increasing knowledge of the forces of nature acquired by the patient investigations continually carried on by scientists of every class, in chemistry, in geology, in natural philosophy, in mining, both in the methods of mechanical operations and in the reduction of ores; in short, in the general application of the discoveries of science throughout the various realms of nature to the needs of man which so constantly revolutionize former methods and create ever new demands; for example, in the endeavor to secure the economic production of electricity and to contrive the best methods for its application to human uses, not to speak of the similar needs in other fields, the demand on the community for the founding of institutions for giving thorough training in these latest discoveries of science is imperative.

In all these ever-recurring demands for the invention and application of methods by which to make these discoveries of science available in the industries of life, a knowledge of, and practical facility in the art of mechanical drawing becomes absolutely indispensable; consequently, this elementary branch of industrial art clearly forms an essential factor in modern industrial education, and, of necessity, holds place in all the elementary and higher schools of technology. To close this sketch of the beginning and progressive development of this important educational movement, without making honorable mention by name of some, at least, of the many enthusiastic supporters and earnest co-workers with the three men who were literally the pioneers in this momentous experiment, is to leave it incomplete indeed. To give here a complete list of the many educators and lovers of beauty who gave it warm welcome; of the modest teachers who shrank from no labor in the effort to fit themselves to teach the unfamiliar lessons were an impossible task. Great effort was made, however, by the writer in the volumes of the art and industry report to secure full record of the names of all workers for this special branch of education. It may be said, greatly to the credit of our countrymen, that while there was at first, on the part of many, great and freely outspoken opposition to the movement, yet very many of the acknowledged lead-

ers in educational circles—State or city—school superintendents, with professors in colleges and normal schools,—gave instant and hearty welcome to Walter Smith and his methods; that the press generally gave support to the efforts to put both drawing and manual training in the schools, and that, as rapidly as the purpose and methods of industrial drawing were generally known that movement won for itself popular support, while the movement for manual training in the schools was at once heartily welcomed by the great majority of the people.

One movement, almost contemporary, for promoting instruction in the fine arts, both in the institutions of learning and in the community at large, met with cordial response from many of the colleges and from numerous liberal citizens. As the result of generous gifts, public collections of casts from the antique became accessible in many institutions of learning and in many localities where, before 1870, they were absolutely unknown. To patronize artists, and also to make art gifts to public museums and to colleges, became a fashion, so that great numbers of examples of the best modern art masters of Europe are now in this country, either in the hands of private owners or in public art galleries. Meantime numbers of young American painters and sculptors are winning favor in Europe and America, while the art schools in this country are thronged with eager aspirants. Enough has been cited of American art accomplishment to convince us that one would no longer be justified in saying of this "era" of 1890, as was said of another era at the opening of this chapter, that "the one element absolutely lacking in all American education was the æsthetic." Industrial art proves its worth to a country by its results, as shown in the industrial output. To record the amazing variety and exquisite charm of the countless productions of art work in metals, ceramics, and fabrics by Americans of this "era" would demand volumes.

Consult: Reports issued by United States Department of the Interior, Bureau of Education; 'Art and Industry'; 'Industrial and Manual Training in the Public Schools'; 'Public Art Schools' and 'Public Art Museums.' Also Smith, Walter, 'Art Education, Scholastic and Industrial'; Levy, Florence N., 'American Art Annual'; Palliser, 'American Architecture'; Sheldon, 'American Art'; Hartman, 'History of American Art'; Benjamin, S. G. W., 'American Artists.'

ISAAC EDWARDS CLARKE,

Bureau of Education, Washington, D. C.

Art, History of. See FINE ARTS.

Art, Metropolitan Museum of, a spacious edifice in Central Park, New York, erected by the city for the purpose to which it is devoted. It was incorporated in 1870, and possesses an art collection amounting in value to over \$2,000,000, including the Cesnola collections. The treasures to be found here are various in character and of most profound interest, especially the ancient sculptures and relics from the island of Cyprus. These, in the study of antiquities, are of much value, and many of the other departments possess rare attractions.

Art of Poetry, The ('Ars Poetica'), a famous work by Horace. This is not the name given it by its author, who called it merely a

ART UNIONS — ARTEDI

'Letter to the Pisos.' Horace treats of the unity that is essential to every composition, and the harmonious combination of the several parts, without which there can be no lasting success. In the second part, the poet confines himself to the form of the drama, the principles he has already established being so general that they apply to every class of composition.

Art Unions, a name applied to associations for the encouragement of the fine arts by the purchase of works of art out of a common fund raised by small subscriptions or shares, and their distribution by lot. The first art union was started in France; but the Munich art union was the first of importance. Berlin and other towns of Germany soon followed the example of Munich, and the first art union was founded in Edinburgh in 1834, and proved a complete success. The art union of London soon followed that of Edinburgh.

Arta, ar'ta, the name of a gulf, town, and river. The gulf (ancient *Ambracius Sinus*), an arm of the Ionian Sea, between Greece and Albania, is about 20 miles long by 10 miles broad. Near its entrance the battle of Actium was fought. The town, called also Narda (the ancient *Ambracia*), about six miles north of the gulf, stands on the river, which is here about 200 yards wide, and begins to be navigable. It carries on a considerable trade in wine, oranges, and tobacco. Pop (1896) 7,582.

Ar'taba'nus IV., the last of the Parthian monarchs, who 217 A.D., escaping with great difficulty from a perfidious massacre begun by the Romans under Caracalla, mustered an army, and engaged his foes in a battle which lasted for two days. Peace was then concluded, but Artabanus afterward incited his subjects to revolt, and in a battle, in 226, was taken and put to death.

Ar'taba'zus, the name of several distinguished Persians under the dynasty of the Achaemenidae. When Xerxes advanced against Greece, an Artabazus led the Parthians and Chorasmians. Another Artabazus was general under the Persian king, Artaxerxes II., and afterward revolted against Artaxerxes III. He was forgiven through the exertions of his brother-in-law, Mentor, a favorite and staunch supporter of the next king, Darius, whom Artabazus faithfully attended after the battle of Arbela. Alexander rewarded his fidelity by appointing him satrap of Bactria.

Artagnan d', dar'ta-nyân', the hero of Dumas' 'Trois Mousquetaires,' 'Vingt ans après,' and 'Le Vicomte de Bragelonne.' He is a Gascon adventurer, very popular among heroes of romance. There was, however, a Count d'Artagnan (b. about 1612; d. 1673), who was an officer of musketeers, and fell in the siege of Maestricht.

Artasires, (ar'ta-väs'dēz) the last Arsacid monarch of Armenia. He was placed on the throne by Bahram V. of Persia, who afterward deposed him and annexed his dominions to Persia, under the name of Persarmenia, 248 B.C.

Artavasdes (ar'ta-väs'dēz) I., a king of Armenia, who succeeded his father Tigranes. He joined the Roman forces commanded by Crassus, but deserting to the enemy, caused the defeat of the Romans, and the death of Crassus. He simi-

larly betrayed Mark Antony when engaged against the Medes; but afterward falling into Antony's power, was taken with his wife and children to Alexandria, where they were dragged at the victor's chariot wheels in golden chains. After the battle of Actium, Cleopatra caused his head to be struck off and sent to the King of Media.

Artax'ata, the name of the ancient capital of Armenia, the refuge of Hannibal when forsaken by Antiochus. Its ruins are now known as Ardashir.

Artaxerxes, är'täks-erks'ēz, the name of several Persian kings: (1) ARTAXERXES I., surnamed LONGIMANUS, because his right hand was longer than his left, the second son of Xerxes, escaped from Artabanus and the other conspirators who had murdered his father and elder brother Darius, and in 465 B.C. ascended the throne. He conquered the rebellious Egyptians, terminated the war with Athens by granting freedom to the Greek cities of Asia, governed his subjects in peace, and died 425 B.C. (2) ARTAXERXES II., surnamed MNEMON, from his strong memory, succeeded his father, Darius II., in the year 405 B.C. After vanquishing his brother Cyrus he made war on the Spartans, and forced them to abandon the Greek cities and islands of Asia to the Persians. He favored the Athenians, and endeavored to foment dissensions among the Greeks. His last days were embittered by the unnatural conduct of his son Ochus, who, to secure the crown to himself, caused the destruction of two of his brothers. On the death of Artaxerxes Mnemon, 359 B.C., Ochus ascended the throne under the name of (3) ARTAXERXES OCHUS. After having subdued the Phœnicians and Egyptians, and displayed great cruelty in both Egypt and Phœnicia, he was poisoned in 339 by his general, Bagoas. (4) ARTAXERXES BEBEGAN was the first king of Persia of the race of Sassanides. He was a shepherd's son; but his grandfather, by the mother's side, being governor of a province, he was sent to the court of King Ardavan. On his grandfather's death, Artaxerxes, exciting the people to revolt, defeated and slew Ardavan and his son, and assumed the title of King of Kings. He made vast conquests, and wisely administered the affairs of his kingdom.

Artedi, ar-tä'de, Peter, an eminent Swedish naturalist: b. Anund, 22 Feb. 1705, d. Amsterdam, Holland, 27 Sept. 1735. He went in 1724 to Upsala, and turning his attention to natural history, soon rose to considerable eminence, particularly in the department of ichthyology, the classification of which he reformed upon philosophical principles. This arrangement added greatly to his reputation as a naturalist at the time, and afterward became popular over Europe. In 1728 his celebrated countryman, Linnæus, arrived in Upsala, and a lasting friendship was formed between the two men. In 1732 both left Upsala — Artedi for England, in pursuit of his favorite study; and Linnæus for Lapland, to examine its natural productions; but before parting they reciprocally bequeathed to each other their manuscripts and books upon the event of death. According to agreement his manuscripts came into the hands of Linnæus, and his 'Bibliotheca Ichthyologica' and 'Philosophia Ichthyologica,' together with a life of

ARTEMIA — ARTERIES

the author, were published at Leyden in the year 1738. Linnaeus named a genus of umbelliferous plants *Artedia*, in memory of his friend.

Artemia. See BRINE-SHRIMP.

Artemido'rus, a Greek geographer: b. in Ephesus, who flourished about 100 B.C. His 'Geographonmena' in clever books was an exhaustive work on the various features, geographical, physical, historical, and political, of the larger part of the then known world, founded on the writer's own investigations and the works of preceding writers. Only fragments of his work are extant.

Artemis, a Greek goddess, identified with the Roman Diana. She was the daughter of Zeus (Jupiter) and Leto or Latona, and was the twin sister of Apollo, born in the island of Delos. She is variously represented as a huntress, with bow and arrows; as a goddess of the nymphs, in a chariot drawn by four stags; and as the moon goddess, with the crescent above her forehead. She was a maiden divinity, demanding the strictest chastity from her worshippers, and is represented as having changed Actaon into a stag, and caused him to be torn in pieces by his own dogs, because he had secretly watched her as she was bathing. The Artemisia was a festival celebrated in her honor at Delphi. The famous temple of Artemis at Ephesus was considered one of the wonders of the world, but the goddess worshipped there was very different from the huntress goddess of Greece, being of Eastern origin, and regarded as the symbol of fruitful nature.

Artemisia I., *ar'te-mizh'i-a*, or *mish-i-ä*, a queen of Caria, who lived in the 5th century B.C., and assisted Xerxes in person against the Greeks, and behaved with such valor that the Athenians offered a reward for her capture, and the Spartans erected a statue to her.

Artemisia II., a queen of Caria, who flourished about 350 B.C. She was the sister and wife of Mausolus, whose death she lamented deeply, and to whom she erected, in her capital, Halicarnassus, a monument reckoned among the seven wonders of the world. The principal architects of Greece labored on it. Bryaxis, Scopas, Leochares, and Timotheus made the decorations on the four sides of the edifice; Pythes, the chariot drawn by four horses, which adorned the conical top. Vitruvius thought that Praxiteles was also employed on it. After the death of Artemisia the artists finished it without compensation, that they might not be deprived of the honor of their labor. It was an oblong square, 411 feet in compass, and 130 feet high. The principal side was adorned with 36 columns, and 24 steps led to the entrance.

Artemisia, a genus of aromatic, acrid, and bitter flavored herbs and shrubs of the natural order *Composita*, mostly natives of the northern hemisphere and especially abundant in arid regions. The species are characterized by alternate often deeply-lobed or divided leaves, and numerous small and generally inconspicuous heads of yellow or whitish florets. The cultivated species, of which there are many, are readily propagated by division and succeed even on poor dry soils. *A. dracunculus*, tarragon or estragon, is a Siberian perennial, long and widely cultivated in Europe, but little in America, for

its leaves, which are used to season dressings, pickles, and other culinary preparations. (See TARRAGON.) *A. absinthium*, wormwood, a native of Europe and Asia, is a spreading and branching perennial herb, 2 to 4 feet tall, with its two- or three-parted silky-downy leaves, and its flower-heads in axillary panicles. It is widely grown in Europe for the manufacture of absinthe (q.v.). *A. abrotanum*, southernwood, old man, is a shrubby species, 3 to 4 feet tall, a native of middle Asia and southern Europe, and is often grown for its pleasant-smelling foliage, which is used among clothing as a moth repellent, and in parts of Europe in the manufacture of some kinds of beer. *A. pontica*, Roman wormwood, another European species, resembles *A. absinthium* in properties and is similarly used. *A. vulgaris*, mugwort, is a native of Europe and northern North America, grown for its pleasant-smelling ornamental foliage, which in some varieties is golden or variegated. Its young shoots and leaves are used in German cookery, and like *A. absinthium*, in domestic medicine. *A. stelleriana*, old woman, a native of northeastern Asia and common on the Massachusetts coast, is a useful border plant on account of the whiteness of its foliage. *A. arbuscula*, a species seldom more than one foot tall, and *A. tridentata*, which though usually low growing, occasionally reaches a height of twelve feet, are representative of the many species known as sage brush (q.v.) in the arid districts of the western United States, where they furnish valuable forage for cattle and especially sheep. *A. mantma* and several other species are grown for their flower heads, which are used in medicine as a vermifuge and sold under the name of worm seed or as santonine, the colorless crystalline active principle. *A. moxa*, *A. chinensis*, and other species furnish moxa, a cottony material obtained from the leaves which are covered with down, used by the Chinese for cauterizing. Numerous other species are employed in the manufacture of absinthe, for culinary, ornamental, and medicinal purposes in various parts of the world. For physical action and toxicology, see ABSINTHE.

Artemisium, *ar-te-mish-i-um*, a promontory in Euboea, an island of the Ægean, near which several naval battles between the Greeks and Persians were fought, 480 B.C. It was named from a temple to Artemis situated here.

Artemus Ward. See BROWNE, CHARLES FARRAR.

Arte'rial Pressure. See BLOOD PRESSURE.

Ar'teries, the vessels in the human body that carry arterial, or oxygenated blood away from the heart. The old name, signifying carriers of air, is retained, although the ancient belief has been laid aside. The arteries spring from the heart, as the aorta (q.v.) and by the branching and division of the main branches of this large arterial trunk, are distributed in successively finer branches to all parts of the human body. The blood supply for the head is mainly derived from the carotid arteries, the superficial, or external carotid, supplying the outer structures, and the deep or internal carotid that gives nourishment to the brain and deeper lying parts. There are numerous anastomoses between the branches of the carotid arteries. The main sup-

ARTERIES — ARTESIAN

ply of the arm has been described under the head aorta (q.v.), as well as the branches that supply the viscera and the lower limbs. Arteries become smaller and smaller as they approach the periphery of any organ and are finally converted into capillaries which anastomose with the capillaries of the veins; these carry the blood back to the heart and thus the circle is completed. The minute structure of the arteries is well adapted to the varying functions that these vessels perform. In every large and medium-sized artery, three distinct layers or coats may be distinguished under the microscope. The inner coat, or the *tunica intima*, is thin and smooth, and consists of an inner layer of flat plate-like endothelial cells that are continuous throughout the entire system of blood vessels. This endothelial layer by its smoothness reduces friction of the flowing blood to a minimum. Surrounding it are two layers of fibrous elastic tissues. The middle coat of the arteries is the *tunica media* and is composed mostly of smooth muscle fibres, with some fibrous tissue. These muscle fibres are arranged in a circular manner about the arteries. The outer coat, or the *tunica adventitia*, is made up of white fibrous tissue. Thus the arteries have elastic and fibrous tissues in each coat. The outer layer is extremely tough and thus strengthens and protects; the middle layer by means of its elasticity permits the artery to return to its average diameter after it has been dilated or contracted by the muscular layer. In the larger arteries the yellow fibrous tissue predominates, while in the smaller arteries there is a relatively larger amount of muscle fibre. The large arteries are thus more elastic and less contractile, while for the smaller arteries the reverse is true. The muscle fibres are under the control of the sympathetic nervous system nerve fibres. In the capillaries the artery is reduced to its single endothelial layer, and has neither elastic fibres nor muscle fibres.

Arteries, Diseases of. The arteries are subject to a number of diseases which may be classed as (1) due to infectious micro-organisms, (2) degenerations with increase of connective tissue, (3) aneurisms. Of the acute infectious diseases, tuberculosis and syphilis, particularly the latter, are important. Syphilis is one of the most important causes of arterial degeneration. *Acute arteritis* is a definite disease, although the great pathologist, Virchow, taught that it was a secondary affection. Recent bacteriological studies, however, have shown that bacterial infection of the arterial walls is a fundamental and important process. It is frequently the cause of an arterial thrombus and often develops into a true arteriosclerosis. Under the general head arteriosclerosis is classed a diffuse or circumscribed thickening of the arterial walls, especially of the *tunica intima*, secondary to inflammatory or degenerative changes in the *tunica media*. When occurring in the large arteries, the term *atheroma* is used. Arteriosclerosis is sometimes found in the young, but is usually a disease of later life. Among the causes favoring its development are: (1) changes in the composition of the blood, such as toxins from bacterial infections (syphilis, rheumatism), metallic poisons, alcohol, and the disturbed metabolism of gout, Bright's disease, etc., and (2) changes in the tension of the blood vessels. These occur as a result of excessive

and prolonged muscular exertion and intense emotional activity. Arteriosclerosis may be circumscribed or diffuse. It may show irregular plaques of a transparent or gelatinous character which at a later period become hard and firm, or even calcified with the formation of brittle or pipe stem arteries. Sometimes the arteries undergo a fatty degeneration. There is a proliferation of the connective tissue and a degeneration of the elastic tissue. The arteries thus become less responsive to control and so interfere with the nervous impulses. In the diffuse form the proliferation and degeneration is more uniform. Arteriosclerosis is one of the most important of all diseases since by its interference with the proper blood supply of an organ, it may occasion disease in that organ. In pronounced generalized arteriosclerosis all of the organs of the body suffer. Arteriosclerosis is one of the most important elements in the production of cerebral hemorrhage, one of the forms of apoplexy. Aneurisms have already been considered under that heading.

Arteriosclerosis. See ARTERIES, DISEASES OF
Artesian (är-tě-zhăn) Wells, borings of considerable depth which tap a subterranean stream or sheet of water. The name is derived from artois (Latin *artesium*), a province in France where the first deep borings in Europe were made. Strictly speaking the term artesian is applicable only to such wells as discharge water at the surface under natural conditions (that is, self-flowing wells), but in America the term is commonly applied to any wells of more than ordinary depth. As the latter type of wells does not possess any features of special interest the term will here be used in its limited sense. The conditions which determine the presence of artesian water in a region relate to the geological structure of the underlying strata. It is essential in the first place that a pervious stratum enclosed above and below by impervious layers be present. The pervious bed, usually sandstone or sand, serves as a reservoir for the accumulation of water, while the impervious beds prevent this water from escaping either upward or downward. The second requisite is that the strata have a gentle pitch toward the site of the well and that they outcrop at some place above the mouth. The distance of the outcropping edges, which receive the water supply from rains, is sometimes very great, and is immaterial if the enclosing beds are perfectly impervious, except as it modifies the resistance offered to the passage of the water. Owing to this friction the water column of the well never reaches the level of the outcropping source. The conditions for artesian water are particularly favorable when the strata are arranged in the form of a geological basin dipping in all directions toward the well, as there then is no opportunity for the water to escape at a lower level. From these considerations it is evident that the discharge from an artesian well depends upon the rainfall of the region and upon the area of the exposed porous stratum. At first the discharge is usually very abundant owing to the long accumulation, and unless this drain is constantly supplied the flow will gradually decrease until a balance is established. When several wells are bored in the same vicinity, the flow from each may be diminished, but the total discharge will increase until the limit of supply is reached. This is

ARTEVELD — ARTHRITIS

well illustrated in the wells bored in the London basin which in 1838 gave a total daily supply of 6,000,000 gallons; in 1851 with a larger number of borings the supply was about doubled, while the force had diminished very markedly. Artesian water is valuable not only for domestic use, for which it is usually adapted by its purity, but it is also extensively employed in the irrigation of arid regions. Some parts of the Sahara Desert have been reclaimed by making use of the subterranean stores of water, and recent investigations have shown that there are many areas which may yet be brought under cultivation. It is, however, in the United States that irrigation by artesian waters has reached its greatest development. Special surveys of the Great Plains region have been undertaken by the United States Geological Survey for the purpose of defining the areas where successful borings may be made, and artesian wells are now largely employed for irrigation in Kansas, Iowa, Colorado, Montana, and Texas. The supply is drawn mostly from the Cretaceous sandstone, which is reached at a depth varying from less than 100 to more than 1,500 feet. When the flow of water is sufficiently strong it may be utilized for power purposes as is done in some parts of Europe. In Wurtemberg a supply of warm water is applied to the heating of buildings.

The depth at which artesian water may be found depends entirely upon local conditions. In the Paris basin the water-bearing stratum is usually encountered at a depth exceeding 1,500 feet. The famous well at Grenelle, near Paris, was begun in 1833, and operations were continued until 1841 when at a depth of 1,797 feet the water poured out with great force at the rate of 500,000 gallons per day. Another well was sunk near by at Passy, which yielded 5,600,000 gallons daily, the water rising to a height of 54 feet above the mouth. This well was 1,923 feet deep and had the unusual diameter of 2 feet 4 inches. A well at Kissingen, Bavaria, furnishes a supply of saline water from a depth of 1,878 feet. The deepest well in the world is at Schladenbach, near Leipsic, 5,735 feet. In the United States there are many notable examples of artesian wells. The first boring of great depth was made at St. Louis in 1849-54; a flow of 75 gallons per minute was obtained from a depth of 2,200 feet, but the water was so heavily charged with sulphuretted hydrogen and mineral matter as to be unfit for domestic use. Another boring was subsequently made to a depth of 3,843 feet. A well at Louisville, Ky., is 2,086 feet deep and yields 330,000 gallons per day. Among other noteworthy wells are the following: Columbus, O. (2,775 feet); Galveston, Tex. (3,071 feet); Charleston, S. C. (1,250 feet); Pittsburg, Pa. (4,625 feet); and Chicago (710 feet). A great many wells have been bored in recent years within the Atlantic Coastal Plain, especially in New Jersey, and many cities have thus obtained supplies of pure water. The cost of sinking artesian wells varies with the depth and the character of the strata encountered. Up to 500 feet the cost commonly ranges from \$1.50 to \$3.00 per foot, but below this limit the cost increases in proportion to the depth. The apparatus used in boring does not differ from that employed in sinking for petroleum. The first artesian borings were probably made by the

Chinese. In the upper basin of the Yang-tse-Kiang there are wells 1,500 to 3,000 feet in depth from which brine for salt manufacture is obtained. This industry has been carried on since a very early period and is an illustration of the comparatively advanced state of progress attained by this people long before the western nations had developed the mechanical arts beyond the crude stage. Deep wells have been found also in Egypt which are thought to have been the work of the ancient Egyptians. A well bored in the year 1126 at Lillers, department of Pas-de-Calais, France, is still flowing.

Arteveld, ar'tě-vě'l'dě, or **Artevelde**, the name of two men distinguished in the history of the Netherlands. (1) **JACOB VAN**, a brewer of Ghent, b. about 1290; d. 17 July 1345. He was selected by his fellow townsmen to lead them in their struggles against Count Louis of Flanders. In 1338 he was appointed captain of the forces of Ghent, and for several years exercised a sort of sovereign power. A proposal to make the Black Prince, son of Edward III of England, governor of Flanders, led to an insurrection, in which Arteveld lost his life. (2) **PHILIP VAN**, son of Jacob, b. 1340; d. 27 Nov. 1382. At the head of the forces of Ghent he gained a great victory over the Count of Flanders, Louis II., and for a time assumed the state of a sovereign prince. His reign proved short-lived. The Count of Flanders returned with a large French force, fully disciplined and skilfully commanded. Arteveld was rash enough to meet them in the open field at Roosebeke, between Courtrai and Ghent, in 1382, and fell with 25,000 Flemings. See Ashley, 'James and Philip van Artavelde' (1883); Hutton, 'James van Artavelde' (1882).

Artevelde, **Philip van**, the title of a tragedy by Sir Henry Taylor, published in 1834. It is one of the best of modern English tragedies by an author distinguished for his protest, in the spirit of Wordsworth, against the extreme sentimentalism of Byron. In this play with admirable power he brings back the stress and storm of 14th century life. The father of Philip, the great Jacob van Artevelde, an immensely rich brewer, eloquent and energetic, had played a great part as popular leader at Ghent, 1335-45; and it fell to his son to figure similarly in 1381, but to be slain in a great defeat of the forces of Ghent the next year. Taylor's tragedy recalls the events of these two years.

Art'ful Dodg'er, **The**, the nickname of John Dawkins, a young pickpocket in Dickens' 'Oliver Twist.'

Arthralgia (Neo.-Lat. from Gr. *ἀρθρον*, joint, + *ἀλγος*, pain), pain in a joint; used more specifically of neuralgia in a joint. It is synonymous with arthrodynia.

Arthri'tis, an acute or chronic inflammation of the joints, usually due to bacterial infection. Such infection may follow a wound, a perforating injury, an operative incision, or the micro-organisms may come to the joint through the blood stream, as in rheumatism, gonorrhœa, typhoid, or pyæmia. In some cases of arthritis the causes seem to be resident in defective metabolism—gout is an illustration of this type of arthritis. In acute cases there are pain, swelling, heat, and occasionally suppuration. In the chronic forms the main symptoms are pain and

ARTHRITIS DEFORMANS

stiffness. The treatment should include rest, counter-irritation, and, in the suppurative cases, prompt surgical attention. In the more chronic cases counter-irritation, dry, hot air, static electricity, and potassium iodide are of service. See ANTHRITIS DEFORMANS; GOUT; JOINT; RHEUMATISM.

Arthritis Deformans (rheumatoid arthritis, or osteo-arthritis), a chronic progressive disease of the joints, chiefly affecting the articular cartilages, bones, and synovial membranes, and producing loss of function and great deformity from ossification of some parts of the joint and atrophy of others. Its origin is not definitely known. Though it is sometimes spoken of as rheumatic gout, it is believed to have nothing in common with rheumatism or gout, but may co-exist with either.

It is very rare in children, occurs occasionally in old age, is more common between 25 and 50, and in females than in males. It most often appears after the menopause, though it may occur earlier, as when following parturition. It is doubtful whether the disease is hereditary, although several cases may occur in one family. Exposure to inclement weather, dietetic errors, injuries, etc., have less causative influence than in gout or rheumatism, but poor food, debility, anæmia, and cold and damp increase the severity of the disease. Mental strain precedes many cases and adds very much to the severity of the disease.

There are two theories as to the immediate cause of the affection. The first, the nervous or neuropathic theory, is based upon the symmetrical distribution of the joint-lesions, the trophic changes in the skin, nails, etc., the frequent pre-existing mental disturbances, shock, grief, worry, and the like, the disproportionate muscular atrophy, and the similarity of the lesions to those of locomotor ataxia and other affections of the spinal cord. The second or infectious theory is derived from the facts that micro-organisms have been found in the fluids and tissues of the joints, that the disease sometimes begins with an acute onset, as do many of the infectious diseases, and that enlargement of the spleen and lymph-glands is found in some cases. It is difficult to say which tissue is primarily at fault, but sooner or later nearly all are involved. The synovial membrane inflames, and papillary outgrowths and cartilaginous nodules form upon it. These last may undergo fatty degeneration, or they may ossify. They may slip into the joint-cavity. If serous effusion occurs it is absorbed early in the disease. The cartilages lose their cells, become fibrillated and soft, and are removed by friction and absorption. The ends of the bones (the interarticular cartilages being absorbed) by friction become smooth, rounded, and shiny, like polished ivory (eburnated). The eburnated surfaces, by attrition, become grooved, and minute perforations of the Haversian canals result. Deposits of new bone form around the margins of the joints, and may be often felt externally. The muscles atrophy and are of a brownish color. Fibrous adhesions and bony ankylosis occur. Some of the small joints of the fingers, for example, may move a little, but the knees, etc., may be interlocked, by reason of the rims of bony material deposited. Dislocation or subluxation may result. The periosteum along the shafts of the bones may thicken or ossify in nodules.

The acute form of the general or multiple progressive type is rare after 40. Smaller joints become simultaneously painful, tender, and swollen, but not red as in rheumatism; there is no migration from joint to joint, the affected joints are inflamed, while others are becoming diseased. Patients are anæmic, mentally depressed, and complain of headache and malaise. Fever seldom goes above 102°. Temporary improvement occurs, but the disease advances. The chronic form of this type is insidious and more common. One joint (of finger or toe) is involved; the disease affects the corresponding joint, and then other joints; pain may be mild or very severe; there are delusive intervals while the disease marches on. After months, or it may be years, all or nearly all of the joints are thickened, rigid, and distorted. The hands are bent toward the ulnar side, fingers strongly flexed, nails in the palms of the hands. The thumbs, though drawn in, may be used. The knees are generally crossed. The general health through it all may be fair, as visceral lesions are uncommon.

In the monarticular or localized type, the disease is usually confined to one or two of the larger joints, occurs mostly in men, and after 50. The knee, shoulder, elbow, or hip is generally affected, but the vertebræ may be, the entire spinal column becoming rigid. Motion of affected joints often produces a creaking or grating sound. The pathological appearances are similar to those of the general type of the disease, but joint-injuries are more often an exciting cause. The joint becomes stiff, sore, and painful, and there is absorption of the ends of the bones, dislocation, and deformity.

Heberden's nodes or nodosities, described by him in 1805, are small exostoses ("small hard knobs"), seldom larger than peas, which form on either side of the distal joints of fingers. They may be present in either type of the disease, at first are tender and swollen, but later on apparently cause little discomfort. Sometimes the bone-enlargement surrounds the joint.

Arthritis deformans in children, although not frequent, is more acute, and is more influenced by poor food, cold and damp, etc. There is fever, sometimes a chill. The swelling, stiffness, and tenderness seem to be more in the soft parts than in harder tissues. The fingers are flexed and overlapped, the feet are strongly extended, and the joints are rigid.

The diagnosis of arthritis deformans must be made from subacute and chronic rheumatism, gonorrhœal rheumatism, gout, progressive muscular atrophy, Charcot's disease, etc. Recovery is impossible, but the disease is not directly dangerous to life. Treatment for relief is hygienic and dietetic, a warm, dry, equable climate, dry, healthful quarters, change of scene, freedom from anxiety, shock, etc., woolen underclothes, flannel nightgowns or pajamas, and ample diet. Malt extracts, iron, and cod-liver oil are of service. Locally there should be application of massage, friction, electricity, douching, hot air in so-called hot-box, guaiacol and glycerine in equal parts, or belladonna ointment, cotton, and oil-silk. Residence at one of the spas, with appropriate care and treatment, will relieve suffering and prolong life. See ARTHRITIS; GOUT; JOINT; RHEUMATISM.

ARTHROACE—ARTHROPODA

Arthroace (Neo-Lat. from Gk. *ἄρθρον*, joint + *κακός*, evil), a disease of the joints in which the bone is disintegrated and carried away piecemeal. See **CARIES**.

Arthro'dia. See **JOINT**.

Arthrodynia (Neo-Lat. from Gk. *ἄρθρον*, joint + *δύνη*, pain), pain in a joint; practically synonymous with **arthralgia**.

Arthrogastra (Neo-Lat. from Gk. *ἄρθρον*, joint + *γαστήρ*, abdomen), a division of the insect class *Arachnida* (q.v.), having the abdomen annulated, and including the scorpions (see **SCORPION**), etc.

Arthromere (Gk. *ἄρθρον*, joint + *μέρος*, part), one of the series of segments of which arthropoda (q.v.) are composed.

Arthropathia Tabidorum, a disease of the joints in connection with spinal disease (*tubercles dorsalis*), very similar to *arthritis deformans* (q.v.). The destruction of the ends of the bones in the joint concerned takes place with great rapidity and painlessly; there is no fever nor appearance of inflammation, even when the bones are fractured.

Arthrophragm (Gk. *ἄρθρον*, joint + *φράγμα*, fence), a partition between certain articulations, as, for example, in the crayfish (q.v.).

Arthropleure (Neo-Lat. *Arthropleura*, from Gk. *ἄρθρον*, joint + *πλευρά*, side), the lateral portions of the arthroderm, or crust, of articulated animals. See **ARTICULATA**.

Arthrop'oda, a phylum comprising those articulated animals which have jointed appendages, such as antennæ, jaws, maxillæ (or accessory jaws), palpi, and legs, arranged in pairs, the two halves of the body thus being more markedly symmetrical than in the lower animals. It is by far the most numerous in species of any in the animal kingdom, the insects alone probably numbering upward of a million species; other representative or typical forms are the trilobites, king crabs, scorpions, spiders, and myriopods. The skin is usually hardened by the deposition of salts (carbonate and phosphate of lime), and of a peculiar organic substance called chitine. The segments (somites or arthromeres) composing the body are usually limited in number, 20 (or 21) in the crustaceans and insects; while each arthromere is primarily divided into an upper (tergum), lower (sternum), and lateral portion (pleurum). These divisions, however, cannot be traced in the head of either the crustaceans or the insects. Moreover, the head is well marked, with one or two pairs of feelers or antennæ, and from two to four pairs of biting mouth-parts or jaws, and two compound eyes; besides the compound eyes there are simple eyes in the insects. The germ is three-layered, and there is usually in the more specialized forms a well-marked metamorphosis. The *Arthropoda* are most nearly related to the worms, certain annelides, with their soft-jointed appendages (tentacles as well as lateral cirri) and more or less definite head, anticipating or foreshadowing the arthropods. On the other hand, certain low parasitic arthropods, as *linguacula*, have been mistaken for genuine parasitic worms.

Segmentation of the Body.—The segments (somites, metamereres) are merely thickenings of

the skin connected by a thin intersegmental membrane, so that the segments can telescope into each other, or extend, thus lending the greatest freedom of motion to the trunk as well as to the appendages; otherwise a rigid chitinous skin would not permit of any movement. As in the annelid worms, this segmentation of the integument is correlated with the serial repetition of the ganglia of the nervous system, of the ostia of the dorsal vessel, the primitive disposition of the segmental and reproductive organs, of the soft, muscular dissepiments which correspond to the suture between the segments, and with the metameric arrangement of the muscles controlling the movements of the segments on each other; and this internal segmentation or metamerism is indicated very early in embryonic life by the mesoblastic somites.

While we look upon the dermal tube of worms as a single but flexible lever, the body of the arthropods, as Graber states, is a linear system of stiff levers. We have here a series of stiff, solid rings, or hoops, united by the intersegmental membrane into a whole. When the muscles extending from one ring to the next behind contract, and so on through the entire series, the rings approximate each other.

The origin of the joints or segments in the limbs of arthropods was probably due to the mechanical strains to which what were at first soft fleshy outgrowths along the sides of the body became subjected. Indeed, certain annelid worms of the family *Syllida* have segmented tentacles and parapodia, as in *Dujardinia*. We do not know enough about the habits of these worms to understand how this metamerism may have arisen, but it is possibly due to the act of pushing or repeated efforts to support the body while creeping over the bottom among broken shells, over coarse gravel, or among sea-weeds. It is obvious, however, that the jointed structure of the limbs of arthropods, if we are to attempt any explanation at all, was primarily due mainly to lateral strains and impacts resulting from the primitive endeavors of the ancestral arthropods to raise and to support the body while thus raised, and then to push or drag it forward by means of the soft, partially jointed, lateral limbs which were armed with bristles, hooks, or finally claws. By adaptation, or as the result of parasitism and consequent lack of active motion, the original number of segments may by disuse be diminished. Thus in adult wasps and bees, the last three or four abdominal segments may be nearly lost, though the larval number is ten. During metamorphosis the body is made over, and the number, shape, and structure of the segments are greatly modified.

History and Present Classification.—The group or sub-kingdom (phylum) of *Arthropoda* was founded in 1848 by Siebold. It has been supposed until recently to be a natural group. In 1893 Kingsley, and also Kennel, first suggested doubts as to the homogeneity of the group, and in the same year Packard published the view that there are four independent lines of development in the *Arthropoda*, and in 1894 Kingsley divided the group into three subphyla, Laurie and Pocock also considering that the group is polyphyletic. In 1898 Packard stated: "It is becoming evident, however, that there was no common ancestor of the *Arthropoda* as a whole, and that the group is a polyphyletic one.

ARTHROSTRACA — ARTHUR

Hence, though a convenient group, it is a somewhat artificial one, and may eventually be dismembered into at least three or four phyla or branches."

The four phyla as afterward proposed by Packard are, beginning with the most primitive: (1) *Palaeostraca*, embracing the classes of *Trilobita*; (2) *Merostomata* (*Limulus*), and *Arachnida*; (3) *Pancarida* (*Crustacea*); (4) *Prosogoneata*, including three classes: *Paupropoda*, *Diplopoda*, and *Lymphyla* (*Scolopendrella*); and (5) *Entomoptera*, comprising the *Chilopoda* and *Insecta*; the great majority of the group being winged insects. Each of these phyla represent independent lines of development, judging by their structure and what we know of their development, and have no genetic connection beyond the theory that they each have descended from one or more annelid worm.

A. S. PACKARD,
Brown University.

Arthrostraca, crustacea of the sub-class *Malacostraca* in which the first, sometimes the second thoracic segment is fused with the head and bears maxillipedes; the remaining seven being free and bearing legs. The eyes are usually sessile. The group is divided into the *Amphipoda* (q.v.) and *Isopoda* (q.v.) Common examples are pill-bugs, wood-lice, etc

Ar'thur, king of the Silures in the 6th century, an ancient British hero, whose story has been the theme of much romantic fiction. He is said to have been the son of Uthyr, chief commander of the Britons, and to have been born about 501. In 516 he succeeded his father in the office of general, and performed those heroic deeds against the Saxons, Scots, and Picts which have made him so celebrated. He married the celebrated Guinevere belonging to the family of the dukes of Cornwall; established the famous order of the Round Table; and reigned, surrounded by a splendid court, 12 years in peace. After this, he is reported to have conquered Denmark, Norway, and France, slain the giants of Spain, and journeyed to Rome. From thence he is said to have hastened home on account of the faithlessness of his wife, and Modred, his nephew, who carried on an adulterous intercourse, and stirred up his subjects to rebellion; to have subdued the rebels, but to have died in consequence of his wounds, in 542, on the island of Avalon, where it is pretended that his grave was found in the reign of Henry II. The story of Arthur is supposed to have some foundation in fact, and it is generally believed that he was one of the last great Celtic chiefs who led his countrymen from the west to resist the settlement of the Saxons in southern Britain. But many authorities regard him as a leader of the Cymry of Cumbria and Strath-Clyde against the Anglo-Saxon invaders of the east coast and the Picts and Scots north of the Forth and the Clyde. In our own day the interest of the old legends has been revived by the works of Lytton and especially Tennyson. See Skene, 'Four Ancient Books of Wales' (1868); Stuart-Glennie, 'Journey through Arthurian Scotland' (1867); and 'Arthurian Localities' (1869); Rhys, 'Studies in the Arthurian Legend' (1891); Sommer, 'Morte d'Arthur' (3 vols. 1889-91); Brown, 'Twain: A Study in the Origin of Arthurian Romance' (1902). See ARTHURIAN LEGENDS.

Ar'thur, Prince. See DUKE OF CONNAUGHT.

Ar'thur, duke of Brittany, the grandson of King Henry II. of England: b. 1187; d. 1203. On the death in 1199 of his uncle, Richard I., who had declared the boy his heir, Arthur was proclaimed king of England by the nobles of Anjou, Touraine, and Maine, while the English lords decided in John's favor. King Philip of France supported the claims of Arthur, but a peace being presently concluded between John and Philip, Arthur came later into the hands of his uncle, King John, and soon mysteriously disappeared. According to general belief Arthur was murdered by command of his uncle. The story of Arthur forms a portion of Shakespeare's 'King John.' See JOHN.

Arthur, Chester Alan, the 21st President of the United States. b. Fairfield, Vt., 5 Oct. 1830; d. New York, 18 Nov. 1886. He graduated from Union College at 18, was principal of an academy at North Pownal, Vt., and in 1853 began the practice of law in New York, where he argued several important legal cases in behalf of the colored people. Through these and other cases he became noted in his profession, and he was also prominent as a Republican politician. In April 1861 Gov. E. D. Morgan made him acting quartermaster-general, and later he was made full quartermaster-general. For the next decade he was a successful and widely known practising lawyer, and a leading Republican politician of New York, chairman of the Grant Club in 1868, and of the executive committee of the Republican State committee in 1869. He was appointed by President Grant, 20 Nov. 1871 to the highest office in the State patronage, the collectorship of the port of New York, which he held till 11 July 1878. His business conduct of the office was not impeached, and he was retained by President Hayes for over a year after his accession; but he was first of all a political manager, in open hostility to civil service reform. As a matter of actual practice and not theory, however, Mr. Arthur produced figures to show that the annual percentage of removals under him for all causes had been only 234 per cent, as against an annual average of 24 per cent since 1857. In 1880 he was nominated for the vice-presidency, chiefly to conciliate the Grant section of the Republicans, sore at the defeat of the third-term project, and was elected with Garfield. In place of the customary dignified nullity of his office, he remained an active party leader in the patronage contest of his State, between the "Stalwarts" or Grant section led by Roscoe Conkling (q.v.), and of which Mr. Arthur was chief lieutenant, and the "Half-Breeds" or more independent wing which Garfield was trying to build up. Conkling soon resigned his seat in the Senate, declaring that Garfield had broken his promises to him, and the Garfield party for the time was triumphant; but the assassination of Garfield, shortly after, reversed the situation. The open lamentations of the press at the prospect of the accession of so convinced a spoilsman as himself deeply hurt Mr. Arthur, who felt that he was misjudged, and determined on the most admirable revenge, that of disappointing their prophecies of evil. He did so; not only was his term of office measurably free from the dominance of patronage, but he extended the civil service rules and kept faith with them. In other respects his ad-

ARTHUR—ARTHURIAN LEGENDS

ministration was so excellent that the leading Independents had announced their intention of supporting him for President if nominated in 1884. Its most notable incident was the appointment of a commission to revise the tariff, which, though composed of strong Protectionists, reported that the tariff should be reduced 20 per cent all around, a recommendation unheeded by Congress. Several commercial treaties were passed, however. He vetoed a Chinese immigration bill as inconsistent with treaty obligations; favored the stringent laws passed against polygamy, appointing a Utah commission to supervise their enforcement; managed Indian affairs wisely, promoting Indian education and the breaking up of the tribal system; extended postal facilities; took measures to increase the navy, improve its discipline and efficiency and provide for coast defense; supported the improvement of Mississippi River navigation, etc. The attempts at remonetizing silver, and at forcibly abrogating the Clayton-Bulwer treaty to build a Nicaragua canal, were in accordance with general party feeling at the time. The lingering scandal of the Star Route frauds, however, injured the party somewhat, and its policy and methods were gravely disapproved of by the Independents; but this was much more than counterbalanced by distrust of the Democratic party for its alliance with the Greenback element. Mr. Arthur's defeat for the nomination was not caused by any demerits of his own, still less by desire to conciliate the Independents, but by the personal ambitions of Mr. Blaine (q.v.), who first caused the crushing defeat of Arthur's secretary of war, S. J. Folger, for governor of New York, and in 1884 was nominated for President. Arthur, although a close adherent of Conkling, who was at enmity with Blaine, supported the campaign of the latter.

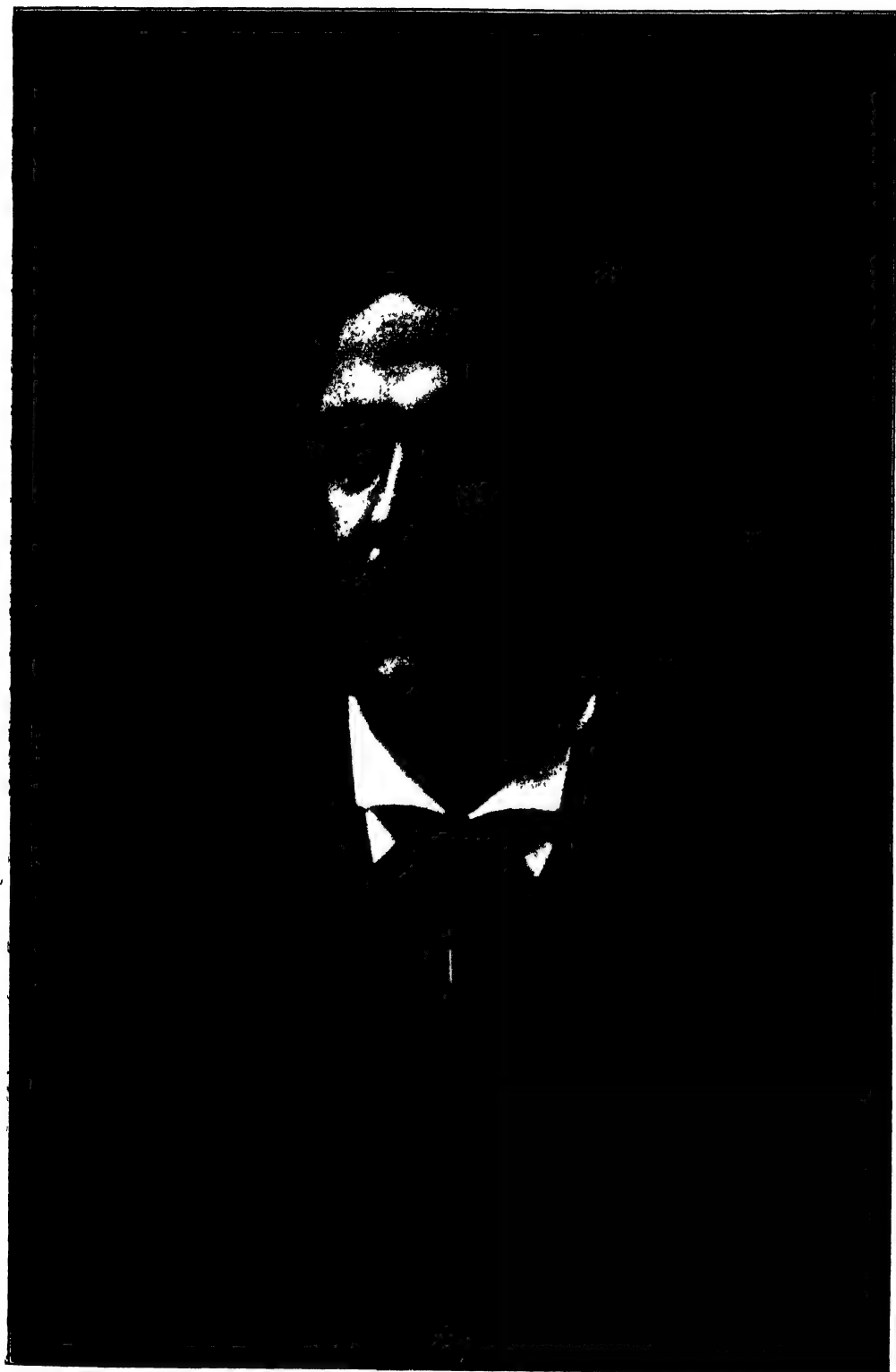
Ar'thur, Joseph Charles, an American botanist: b. Lowville, N. Y., 11 Jan 1850. He was graduated from Iowa State College in 1872, and subsequently studied at the universities of Johns Hopkins, Harvard, and Bonn, Germany. He was instructor in the universities of Minnesota and Wisconsin; botanist at the Experiment Station, Geneva, N. Y., and is now professor of vegetable physiology and pathology, Purdue University, Lafayette, Ind.

Arthur, Julia, the stage name of Ida Lewis, an American actress: b. Hamilton, Ont., 3 May 1869. She made her professional debut at the age of 14 as the Prince of Wales in 'Richard III.' Her first New York success was in 'The Black Masque.' She made her London debut February 1895 in Henry Irving's company, playing roles next to Helen Terry, both of whom she accompanied to America in 1896. Since then she has starred chiefly in the United States. She is the wife of B. P. Cheney. See Strang, 'Famous Actresses of the Day in America' (1899).

Arthur, P. M., American locomotive engineer: b. Scotland 1834; d. Winnipeg, Manitoba, 16 July 1903. He came to America in childhood and as a young man was at first a blacksmith's helper in the employ of the New York and Harlem Railroad Company and later an engineer on the New York Central railroad. In 1873 he became the grand chief of the American Brotherhood of Locomotive Engineers, which post he filled at the time of his death.

Ar'thur, Timothy Shay, an American author: b. Newburg, N. Y., 1809; d. Philadelphia, 6 March 1885. In 1852 he founded 'Arthur's Home Magazine.' He was a voluminous writer of moral and domestic tales. His works are over 100 in number, and have had a large sale in England as well as in the United States. His most popular work was the famous 'Ten Nights in a Bar-Room.' Among his other publications were 'Tales for Rich and Poor,' 'Tales of Married Life,' and 'Lights and Shadows.'

Arthu'rian Leg'ends, a series of Celtic romances, which for nearly a thousand years have furnished unlimited literary material, not to English poets alone, but to the poets of all Christendom. These Celtic romances, having their birthplace in Brittany or in Wales, had been growing and changing for some centuries, before the fanciful 'Historia Britonum' of Geoffrey of Monmouth, flushed them with color and filled them with new life. Through his version they soon became a vehicle for the dissemination of Christian doctrine. By the year 1200 they were the common property of Europe, influencing profoundly the literature of the Middle Ages, and becoming the source of a great stream of poetry that has flowed without interruption down to our own day. Sixty years after the 'Historia Britonum' appeared, and when the English poet Layamon wrote his 'Brut' (A.D. 1205), a translation of Wace, as Wace was a translation of Geoffrey, the theme was engrossing the imagination of Europe. It had absorbed into itself the elements of other cycles of legend, which had grown up independently; some of these, in fact, having been at one time of much greater prominence. Finally, so vast and complicated did the body of Arthurian legend become, that summaries of the essential features were attempted. Such a summary was made in French about 1270, by the Italian Rustighello of Pisa; in German, about two centuries later, by Ulrich Futerer; and in English by Sir Thomas Malory in his 'Morte d'Arthur,' finished 'the ix. yere of the reygne of kyng Edward the Fourth,' and one of the first books published in England by Caxton, 'emprynted and fynysshed in th' abbey Westmestre the last day of July, the yere of our Lord MCCCCLXXXV.' It is of interest to note, as an indication of the popularity of the Arthurian legends, that Caxton printed the 'Morte d'Arthur' eight years before he printed any portion of the English Bible, and 53 years before the complete English Bible was in print. It has been said that the original legend absorbed into itself the elements of other cycles of legend. The most important of these was 'The Holy Grail' (q.v.). At once a new spirit breathes in the old legend. In a few years it is become a mystical, symbolical, anagogical tale, inculcating one of the profoundest dogmas of the Holy Catholic Church, a bearer of a Christian doctrine engrossing the thought of the Christian world. In addition to the mystical and religious character of the transformed legend, the spirit of the chivalry of the Middle Ages embodied in it, furnishes an admirable transcript of the social ideal of the times, which thus moulded the older and ruder materials into a more gracious form. The knightly ideals of loyalty, obedience, the redressing of wrongs and especially the veneration of womanhood are distinctively portrayed.



CHESTER ALAN ARTHUR.

21ST PRESIDENT OF THE UNITED STATES.

Throughout the Middle Ages it was "our lady," the Virgin Mother, who embodied and represented to all men and women, from prince to peasant, their ideals of womanhood and ladyhood. And it was the transference of these Christian ethics into the practice of common daily, worldly life, in rude times, which we owe to the institution of chivalry, nowhere better reflected than in the Christianized Arthurian legends. From about 1200, innumerable poets, with diverse tastes, set themselves to produce new versions of the legend, engrafting upon the general theme many diverse stocks. Dante in the 'Divine Comedy' speaks of Arthur, Guinevere, Tristan, and Launcelot by name, and Boiardo, Ariosto, and Tasso in Italy, Hans Sachs in Germany, Spenser, Shakespeare, Milton, and Dryden in England, all made use of the same material.

Of the poets of the present generation, Tennyson has treated the Arthurian poetic heritage as a whole. Phases of the Arthurian theme have been presented also by his contemporaries and successors at home and abroad—by William Wadsworth, Lord Lytton, Robert Stephen Hawker, Matthew Arnold, William Morris, Algernon Charles Swinburne, in England; Edgar Quinet in France, Wilhelm Hertz, L. Schneegans, F. Roeber, in Germany; Richard Hovey in America. There have been many other approved variations on Arthurian themes, such as James Russell Lowell's 'Vision of Sir Launfal,' and Richard Wagner's operas, 'Lohengrin,' 'Tristan and Isolde,' and 'Parsifal.' Of still later versions, we may mention the 'King Arthur' of J. Comyns Carr, which has been presented on the stage by Sir Henry Irving; and 'Under King Constantine,' by Katrina Trask, whose hero is the king whom tradition names as the successor of the heroic Arthur 'Imperator Dux Bellorum.'

Arthur's Seat, a hill overlooking Edinburgh, Scotland, said to have been so called from a tradition that King Arthur surveyed the country from its summit and defeated the Saxons in its neighborhood. It is a steep, and in some places precipitous, rock, exhibiting on the south side a range of perpendicular basaltic columns, called Samson's Ribs. The highest point is 822 feet above sea-level. From hence may be seen a wide expanse of sea, the course of the Forth, the distant Grampians, etc., and a large portion of the most populous and best cultivated part of Scotland, including the picturesque city of Edinburgh and its castle. On the north side are the ruins of a chapel and hermitage, dedicated to St. Anthony, and a fine spring called St. Anton's Well. A carriage road called the Queen's Drive goes round its base.

Artichoke, two species of the natural order *Compositæ*. The true, sometimes called French, artichoke (*Cynara Cardunculus*—scaly mus of some authors), a native of the Mediterranean region, is a coarse, stout, perennial, thistle-like herb, 3 to 5 feet tall, with rather spiny leaves, the lower of which are often 3 feet or more long, and large terminal heads of blue or white flowers. It is cultivated for the edible thickened outer scales and "bottoms" (receptacles) of the flower heads which sometimes exceed 4 inches in diameter without becoming too old for eating raw as salad, pickled, or cooked like cauliflower. Sometimes the young stems and leaves are blanched like cardoon, with

which some botanists consider it to be identical. In Europe many varieties are popular; in America the globe variety is planted almost to the exclusion of others, with the result that this variety has almost become united to the name in popular usage. The cultivation of this species in America is confined mostly to the southern States, few gardens in the North being supplied with it. Since the plant is rather tender, winter protection must be given where the ground freezes. If planted in rich soil and set four feet apart the plants will yield two or three crops before a new plantation should be made; if allowed to stand longer the yield gradually diminishes. New plantations are made either with seedling or sucker plants. Most of the artichokes offered in the northern markets of the United States come from France and Louisiana.

The Jerusalem artichoke (*Helianthus tuberosus*), a native of North America, is a perennial sunflower-like herb, 5 to 12 feet tall, with rough leaves 4 to 8 inches long and many yellow terminal flower-heads often 2 to 3 inches in diameter. The edible pear-shaped purplish, red, white, or yellow tubers for which the plant is often cultivated are numerous, seldom more than 3 inches in diameter, rather watery but of pleasant flavor especially when prepared like cauliflower, with a white sauce. Perhaps no vegetable is of easier cultivation. For home use the tubers are generally planted in well-drained soil in some out of the way corner of the garden and allowed to take care of themselves from year to year, the few tubers and pieces of root left after digging sufficing to re-stock the bed. In field culture the methods are like those practised with the potato except that the tubers may be left in the ground over winter and dug when needed. They are not injured by frost if in the soil, but if frozen after being dug they spoil quickly. If desired they may be dug and stored in pits like turnips, but with a somewhat lighter covering of straw and earth. The usual yield is from 200 to 500 bushels to the acre but 1,000 bushels are sometimes obtained. When land becomes infested, as it sometimes does, with the plant, pigs, for which the tubers make valuable food, may be turned loose upon the field. The tubers resemble potatoes in composition and like them are used largely in Europe for the manufacture of alcohol. The young plants are sometimes used as cattle food and the dry stalks for fuel. Consult 'Bur or Globe Artichoke' in United States Department of Agriculture Year Book, 1899; Circular 31 (1899); Bailey, 'Cyclopædia of American Horticulture' (1900-02); Vilmorin, 'The Vegetable Garden,' translation by Robinson (1885).

Article, in grammar, a part of speech used before nouns to limit or define their application. In the English language *a* or *an* is the indefinite article (the latter form being used before a vowel sound) and *the* the definite article. The English indefinite article is really a modified form of the numeral adjective *one*; so the German *ein* and the French *un* stand for the numeral and the article. There are traces in various languages showing that the definite article was originally a pronoun; thus the English *he* is closely akin to both *this* and *that*. The Latin language has neither the definite nor the indefinite article; the Greek has the definite; the

ARTICLES

Hebrew and Arabic definite article was prefixed to its noun, while, on the other hand, in the Syriac and Chaldaic it was affixed to the noun, as it is in the Icelandic. In the Scandinavian language the definite article is appended to the end of the word as *hus-et*, the house.

Articles, divisions of a printed or written document or agreement. A specification of distinct matters agreed upon or established by authority or requiring judicial action. In chancery practice articles are a formal written statement of objections to the credibility of witnesses in a cause in chancery, filed by a party to the proceedings, after the depositions have been taken and published. The object of articles is to enable the party filing them to introduce evidence to discredit the witnesses to whom the objections apply, where it is too late to do so in any other manner (2 Daniel Chan. Pr. 1158), and to notify the party whose witnesses are objected to of the nature of the objections, that he may be prepared to meet them. Upon filing the articles a special order is obtained to take evidence. The interrogatories must be so shaped as not to call for evidence which applies directly to facts in issue in the case. 3 Johns. Ch. N. Y. 558. The objections can be taken only to the credit and not to the competency of the witnesses. 3 Johns. Ch. N. Y. 558; 3 Atk. Ch. 643, and the court are to hear all the evidence read and judge of its value. 2 Ves. Ch. 219.

Articles of Agreement.—A written memorandum of the terms of an agreement. They may relate either to real or personal estate, or both, and if in proper form will create an equitable estate or trust such that a specific performance may be had in equity. The articles of agreement should contain a clear and explicit statement of the names of the parties, with their additions for purposes of distinction, as well as a designation as parties of the first, second, etc., part; the subject-matter of the contract, including the time, place, and more important details of the manner of performance; the covenants to be performed by each party; the date, which should be truly stated. It should be signed by the parties or their agents. When signed by an agent the proper form is, A. B., by his agent (or attorney), C. D.

Articles of Confederation.—The title of the compact which was made by the 13 original States of the United States of America. It was adopted and carried into force 1 March 1781 and remained as the supreme law until the first Wednesday of March 1789.

Articles of Faith.—Summarized statements of religious views relating to the central doctrines of a theological system. Protestant divines divide these into fundamental and non-fundamental articles. Familiar examples of articles of faith are the Nicene, Apostles', and Athanasian creeds, the Thirty-Nine Articles, the Westminster, Augsburg, and Helvetic Confessions. See CREED.

Articles of Impeachment.—A written articulation of the causes for impeachment. Blackstone calls them a kind of bill of indictment, and they perform the same office which an indictment does in a common criminal case. They do not usually pursue the strict form and accuracy of an indictment, but are sometimes quite general in the form of their allegations. They should, however, contain so much cer-

tainty as to enable a party to put himself on the proper defense, and in case of an acquittal to avail himself of it as a bar to another impeachment. Additional articles may perhaps be exhibited at any stage of the proceedings. The answer to articles of impeachment is exempted from observing great strictness of form, and it may contain arguments as well as facts. A full and particular answer to each article of the accusation should be given.

Articles of Partnership.—A written agreement by which the parties enter into a partnership upon the conditions therein mentioned. The instrument should contain the names of the contracting parties severally set out; the agreement that the parties do by the instrument enter into a partnership, expressed in such terms as to distinguish from a covenant to enter into a partnership at a subsequent time; the date and necessary stipulations, some of the more common of which follow. The commencement of the partnership should be expressly provided for. The date of the articles is the time, when no other time is fixed by them. The duration of the partnership should be expressly stated. It may be for life, for a limited period of time, or for a limited number of adventures. When a term is fixed it is presumed to endure until that period has elapsed, and when no term is fixed, for the life of the parties, unless sooner dissolved by the acts of one of them, by mutual consent, or operation of law. The duration will not be presumed to be beyond the life of all the partners, but provision may be made in the articles for the succession of the executors or administrators or a child or children of a deceased partner to his place and rights. Where provision is made for a succession by appointment and the partner dies without appointing, his executor or administrators may continue the partnership or not at their option. A continuance of the partnership beyond the period fixed for its termination, in the absence of circumstances showing intent, will be implied to be upon the basis of the old articles (15 Ves. Ch. 218), but for an indefinite time. The nature of the business and the place of carrying it on should be carefully stated. An injunction will be granted by a court of equity when one or more of the partners endeavors, against the wishes of one or more of them, to extend such business beyond the provision contained in the articles. The name of the firm should be ascertained. The members of the partnership are required to use the name thus agreed upon, and a departure from it will make them individually liable to third persons or to their partners in individual cases. The management of the business, or of some particular branch of it, is frequently entrusted by stipulation to one partner, and such partner will be protected in his rights by equity, or it may be to a majority of the partners, and should be where they are numerous. The manner of furnishing capital and stock should be provided for. When a partner agrees to furnish his proportion of the stock at stated periods, or pay by installments, he will, where there are no stipulations to the contrary, be considered a debtor to the firm. Sometimes a provision is inserted that real estate and fixtures belonging to the firm shall be considered as between the partners, not as partnership, but as individual property. In cases of bankruptcy, this property will be treated

ARTICLES — ARTICULATA

as the separate property of the partners. The apportionment of profits and losses should be provided for. The law distributes these equally, in the absence of controlling circumstances, without regard to the capital furnished by each. Periodical accounts of the property of the partnership may be stipulated for. These, when settled, are at least *prima facie* evidence of the facts they contain. The expulsion of a partner for gross misconduct, bankruptcy, or other specified causes may be provided for, and the provision will govern when the case occurs. A settlement of the affairs of the partnership should always be provided for. It is generally accomplished in one of the three following ways: *First*, by turning all of the assets into cash, and after paying all the liabilities of the partnership, dividing such money in proportion to the several interests of the parties; or, *second*, by providing that one or more of the partners shall be entitled to purchase the shares of the others at a valuation; or, *third*, that all the property of the partnership shall be appraised, and that after paying the partnership debts it shall be divided in the proper proportions. The first of these modes is adopted by courts of equity in the absence of express stipulations. Submission of disputes to arbitration is frequently provided for, but such a clause is nugatory, as no action will lie for a breach.

Articles of War — A code of laws for the regulation of the military forces of a country. In the United States the articles of war form an elaborate code, thoroughly revised in 1880, but subject at all times to the legislation of Congress. Those of Great Britain and Ireland were issued prior to 1879, in pursuance of the annually renewed mutiny act. In 1879 the army discipline act consolidated the provisions of the mutiny act with the articles of war. This act was amended in 1881, and now the complete military code is contained in the army act of 1881.

Articles, The Six. In English Church history these were articles of faith imposed by the Act 31 Henry VIII. cap. xiv., passed by Parliament in 1539, and known as the Six-stringed Whip or Bloody Statute, from the merciless persecutions to which it gave rise. They are supposed to have been the composition of King Henry himself, and they had no formal authority from the Church. They enforced belief in transubstantiation; declared communion in both kinds unnecessary; the marriage of priests was unlawful; that vows of chastity or widowhood were absolutely binding; and that private masses and auricular confession were expedient and necessary. The severity of the act was soon mitigated, and it was finally repealed in the first year of Edward VI.

Articles, The Thirty-nine, of the Church of England, a term applied to a body of divinity, chiefly founded on the formulary of Forty-two Articles compiled by Archbishop Cranmer in 1551, in obedience to the command of Edward VI. and the privy council, who instructed him to "frame a book of articles of religion, for the preserving and maintaining peace and unity of doctrine in this Church, that, being finished, they might be set forth by public authority." Several of these articles (the 1st, 2d, 25th, and 31st) were drawn directly from the Augsburg Confession, and the 9th and 16th are traceable to the same

source. During the reign of Mary the Articles were suppressed, but the accession of Elizabeth offered an opportunity of drawing up a fresh formulary. In 1562-3 a convocation was held, in the course of whose sitting King Edward's Articles were carefully considered and revised. As the result of this revision (mainly the work of Archbishop Parker, assisted by Bishops Grindal, Horn, and Fox), four of the original 42 articles were omitted, namely, the 10th, 16th, 19th, and 41st, and articles 5th, 12th, 29th, and 30th were newly introduced; 17 other articles were more or less modified. On a further revision articles 39th, 40th, and 42d were struck out, and some slight changes made in several others. These 39 articles were drawn up and ratified in Latin, but when printed both in Latin and English the 29th was omitted and the first clause of the 20th struck out. The 39th was, however, restored on a final revision by Parker in 1571, and then imposed on the clergy for subscription. They were ratified anew in 1604 and 1628. All candidates for ordination must subscribe these articles, but subscription is no longer necessary on matriculating or taking a degree at Oxford or Cambridge. This formulary is now accepted by the Episcopalian Churches of Scotland, Ireland, and America.

The first five articles contain a profession of faith in the Trinity, the incarnation of Jesus Christ, his descent to hell, and his resurrection, and the divinity of the Holy Ghost. The three following relate to the canon of the Scripture. The 8th article declares a belief in the Apostles', Nicene, and Athanasian creeds. The 9th and following articles contain the doctrine of original sin, of justification by faith alone, of predestination, etc. The 19th, 20th, and 21st declare the Church to be the assembly of the faithful, and that it can decide nothing except by the Scriptures. The 22d rejects the doctrine of purgatory, indulgences, the adoration of images, and the invocation of saints. The 23d decides that only those lawfully called shall preach or administer the sacraments. The 24th requires the liturgy to be in English. The 25th and 26th declare the sacraments effectual signs of grace (though administered by evil men), by which God excites and confirms our faith. They are two: baptism and the Lord's Supper. Baptism, according to the 27th article, is a sign of regeneration, the seal of our adoption, by which faith is confirmed and grace increased. In the Lord's Supper, according to article 28th, the bread is the communion of the body of Christ, the wine the communion of his blood, but only through faith (article 29); and the communion must be administered in both kinds (article 30). The 28th article condemns the doctrine of transubstantiation, and the elevation and adoration of the Host; the 31st rejects the sacrifice of the mass as blasphemous; the 32d permits the marriage of the clergy; the 33d maintains the efficacy of excommunication. The remaining articles relate to the supremacy of the king, the condemnation of Anabaptists, etc.

Artic'ula'ta, a name given by Cuvier to a branch of the animal kingdom embracing the worms (*Annulata*) and *Arthropoda*. The group is not now considered a natural one, and has been subdivided into several branches or phyla.

ARTICULATION — ARTIGAS

Art'iculation. See **JOINT**.

Artificial Camphor, a product manufactured from turpentine. The sap of the pine tree after it is distilled and purified is the turpentine of commerce. A couple of thousand pounds of this material is placed in great steam reaction tanks; these are covered with asbestos to retain the heat. A quantity of oxalic acid, which is rich in oxygen, is likewise placed in the reaction tanks, together with the turpentine, and when the chemical action resulting from the union has been completed two new chemicals are formed and are known as pinol oxalate and pinol formate, respectively. These are in liquid form and are conveyed to a set of distilling tanks by means of a force pump; in these tanks a new element is introduced in the form of an alkali, and when mixed with the liquid live steam is turned on. After distillation camphor results, together with some of the essential oils, such as oil of lemon and others, but these are dissolved in the reaction products, which also contain a kind of camphor termed borneol.

Artificial Flowers, flowers manufactured from cloth or other substances in close imitation of natural flowers, for purposes of ornament. The leaves and petals are generally made of silk or cambric punched out to proper shapes and sizes. These are tinted with a brush and color, and if necessary glazed with gum or sprinkled with fine flock to imitate the glossy or velvety surface of natural flowers. The ribs, where present, are indented with a warm iron. The stamens and pistils are formed of wire covered with silk and dipped in gum-water to form the anthers. The stalk is then made of wire, coated with green paper, and fixed to the stamens and pistil, around which are attached the petals, and lastly the calyx. Buds are made of cotton or glass balls covered with cambric of a proper color. This industry has been successfully carried on in the United States, where a large number of women are constantly employed in making artificial flowers. The coloring matter, however, used for these articles is often nothing less than the deadly poison arsenic. Hoffman and other chemists have shown that the most terrible effects may spring from the use of these arsenical compounds.

Artificial Limbs, substitutes for human arms and legs and parts thereof, the manufacture of which has received the attention of surgeons and mechanics from a very early date. In the great work on surgery by Ambrose Paré, in 1579, he refers to and gives detailed illustrations of an artificial arm and leg, and although the construction was of a rude character they showed a very good attempt to conceal the mutilation. In 1696 an artificial leg was invented by Verduin, a Dutch surgeon. It was composed of a wooden foot, to which was fastened two strips of steel extending up to the knee. To these strips was riveted a copper socket to receive the stump; a leather for lacing around the thigh was connected to the socket by two steel side-joints, thus dividing the points of support between the thigh and stump. The construction of this leg was improved later by Prof Serre of Montpelier. Improvements and new limbs were more recently introduced into England and France by Fred. Martin, M. Charrière, MM. Mathieu and Bechard, but these were mostly unprotected by patents. Thomas Mann secured

patents for artificial limbs 20 Jan. 1790, and 1810. James Potts of England patented a new leg 15 Nov. 1800. This soon became celebrated as the "Anglesea leg," because it was so long worn by the Marquis of Anglesea. An improvement on this leg was patented by William Selpho, who was the first manufacturer of note in New York, where he established himself in 1839. Other inventors and manufacturers soon took a great interest in the business — so many, in fact, that the American patent office shows a record of about 150 patents on artificial legs, or more than double that of all European patents on limbs. The Civil War, which caused the mutilation of so many soldiers and sailors, and the liberality of the government in supplying their losses with artificial limbs, naturally stimulated the efforts of inventors in producing such substitutes as would be accepted. These soldiers and sailors are supplied once in every five years, and to this demand is added that of those who have lost limbs from disease or accident, making in all about 100,000 in the United States who have to be supplied with new limbs on an average of about once in every five to eight years. The perfection to which limbs have been brought is wonderful and very interesting. A person with two artificial legs can walk so perfectly as to avoid detection, and a person with a single amputation can almost defy detection. Notable improvements in artificial limbs, and more particularly in legs, were made by C. A. Frees of New York. One of these improvements, and one of the most important, consists in the movements of the knee and ankle joints, by which the whole limb is strengthened and made more durable. An important feature of this piece of mechanism consists in the introduction of a universal motion at the ankle-joint, imitating the astragalus movement with an additional joint, and thus producing a most perfect artificial substitute. Another of his improvements of equal importance, is in the knee-joint of the leg for thigh amputation, which is so arranged that when in a sitting position the cord and spring are entirely relaxed, relieving all strain and pressure; and when rising to an upright position the cord and spring are again brought into proper position without strain or unnatural movement, no extra attachments being required. Artificial arms and extension apparatus for short legs are also wonderful examples of American ingenuity.

Artificial Respiration. See **ASPHYXIA**; **DROWNING (Treatment)**; **RESPIRATION**.

Artificial Stone, a combination of hydraulic cement, broken stone, sand, etc., cemented together. There are many varieties, some of which are exceedingly valuable for building purposes, especially in localities where building-stone is not readily obtained. Cements thus made increase in strength and solidity for an indefinite period. This stone is in constantly increasing demand. For the various kinds and uses see **CEMENT**.

Artigas, ár-tē'gas, **Fernando José**, a South American soldier, dictator of Uruguay: b. Montevideo, 1755; d. in 1851. In 1811 he joined the revolt of Buenos Ayres against Spain, whose troops he repeatedly defeated; but acting for himself was outlawed by the insurrectionary junta, whose troops in turn he routed and compelled it to cede Uruguay to him in 1814. He then assumed the dictatorship, but in 1820 was

ARTILLERY

defeated and fled to Paraguay, where the dictator Francia banished him to Candelaria. Thereafter he devoted himself to agriculture and philanthropy.

Artillery (a restricted use of a word properly meaning simply "works of skill," "clever inventions"): (1) All firearms too heavy to be carried in the hand and therefore rested on carriages or masonry foundations; (2) the division of army or navy which uses such arms; (3) the science treating of their theory and practice. The first is divided into *horse* artillery,—light guns mainly for cavalry use, with mounted gunners, and much the same as *flying* artillery, for rapid evolutions in the field, whose gunners are either mounted or ride on the gun-carriages of ammunition wagons when moving; *field* artillery, for general infantry service,—sometimes used to include the foregoing, but commonly specialized to mean the same as *foot* artillery, with unmounted gunners; (*light* artillery includes both these classes, as distinguished from the following); and *heavy* artillery,—all that is not mobile enough for field evolutions,—divided into *siege* or *garrison* artillery, for breaching the walls of fortresses or defending field works, and *coast* artillery, for permanent works, with carriages too heavy for transport, classed as *siege*, *casemate*, *barbette*, and *mortar* carriages.

A *park* of artillery is a complete set of artillery equipment,—including the guns, carriages, caissons (see **AMMUNITION**, under "ammunition wagons"), repair outfit, harness, field forges, etc.,—gathered in one spot, in barracks or in action; in the latter case the reserve equipment is "parked" out of range of the enemy's fire. A *train* of artillery is a certain number of pieces mounted on carriages and with all their furniture, ready for marching. "Artillery carriages" means either wagons for carrying ammunition or supplies, as above; or gun-carriages, to draw the guns with or fire them from, which may be either stationary as for coast service and permanent works, or movable as in field service. The part which rests on the ground in firing is called the *trail*; the detachable pair of wheels by which it is drawn about, in addition to the fixed pair, is called the *limber*, and the gun is said to be "unlimbered" when they are taken away to let the gun be served, and "limbered up" when they are attached.

The old word "cannon" is not now used by professionals, but "gun" instead. The volume of a gun's service is defined either by the diameter of its bore, as 6-inch, 12-inch, etc.; or by the weight of the spherical iron solid shot it holds, as 12-pounder, 18-pounder, etc. (often abbreviated to 12's, 18's, etc.). The latter characterization has long been used to denote calibre only, without reference to the actual weight of the projectile it fires: thus, a 12-pounder may fire a 30-pound conical shell. This is necessarily so since the entire disuse of spherical shot (see **AMMUNITION**).

The relation of artillery to small-arms was essentially the same before the invention of gunpowder as afterward: hand-arms, as arrows, darts, slings, swords, etc., corresponded to small-arms and the bayonet; while the artillery consisted of machinery too heavy to be held up, for throwing large projectiles, the power being springs, levers, or weights. Midway between

them, however,—as the matchlock arquebuse, rested on the ground to fire, was between small-arms and artillery, but a far more efficient weapon,—was the crossbow or arbalist: a heavy bow with steel or horn frame, stretched by a winch or in its larger sizes by a windlass, and shooting a notched quarrel (that is, a quadrate or square-headed bolt), or sometimes stones or balls of lead. It could be carried by a hunter, or fixed on field or deck; could penetrate armor, and was so destructive as to be prohibited by the Church except in war against the Infidel; and in the early Middle Ages was as decisive in naval or siege warfare, when well handled, as modern artillery, winning many important sea fights and others; but in the field it was too slow for the highest efficiency, as it could be fired only twice a minute. Its larger sizes were true artillery in the modern sense; and like it, but heavier, were the ballista, springal, and onager, which threw stones from a bucket or bag, also beams and masses of inflammable material, at or over walls of besieged places. The catapult, mangonel, and *trébuchet* (the latter a machine of surprising accuracy and power, as proved by an experimental model made by Prince Louis Napoleon in 1850, and used to breach walls) threw the same missiles by means of a spring lever balanced by a heavy weight, and held down by a windlass.

The introduction of modern gunpowder artillery is clouded by unverifiable legends and confused with the use of explosive mixtures to make a terrifying noise, and with the throwing of inflammable materials by the machines above mentioned. If the Chinese invented it, as alleged, they did it so ineffectively that the great progressive military genius Timur (1333-1405) did not think it worth using; and if the Spanish Saracens used it in Spanish sieges in the 12th century, they did not employ it against Northern foes, nor did the latter borrow it; whereas within a few years of the first verifiable European notice we have it,—a Florentine order of 1326 relating to the manufacture of cannon and iron balls,—it had gone over Europe like wild-fire. The Germans used it at Cividale, Italy, in 1331; Edward III. by at least 1338; the latter formed a regular artillery train of iron and brass cannon in 1344 (in which year also Petrarch speaks of it as familiar and common), and employed it at Crécy in 1346, though ineffectively. Naturally cannon came before small-arms: even so, the first were excessively clumsy in size and construction,—bell-shaped tubes with a touchhole for a train of priming powder set off by a fuse or red-hot iron above; made of iron bars hooped together, or of hand-hammered and bored iron, copper, or brass cylinders; and supported on immense platforms drawn by scores or even hundreds (as with Mohammed II.'s cannon at the siege of Constantinople in 1453) of draft animals, or of men. Sometimes they were not even closed tubes, but open at breech as well as muzzle, the shot being wedged in; sometimes they had no carriages, but were rolled into position and wedged or blocked there. They were mortars rather than cannon in the modern sense, being short and wide-mouthed, and sending off their balls or stones at a great elevation, and were known as bombards or vases. They were of use mainly in siege work; and it was not till toward 1500 that field artillery in its modern sense came into much use, Charles VIII.

ARTILLERY

of France utilizing it in his Italian campaigns from 1488 onward.

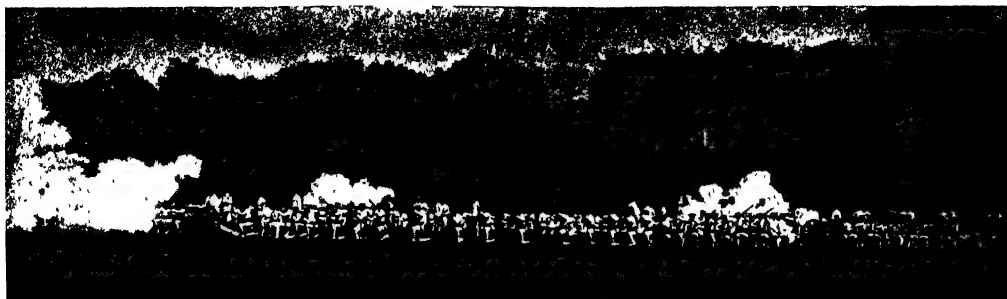
There was no permanent artillery organization: the gunners were detailed from garrisons, and disbanded and sent back there as soon as the campaign was over; and in England the command in the field was by the Master of the Ordnance, an artillery commissary-general in effect. The transport cattle were hired or impressed, and the drivers of gun-carriages were ordinary teamsters hired by contract or secured for the occasion. Curiously, these last did not form a part of the military body till Napoleon's time.

The 16th century developed this arm greatly in volume, but not so much in science: projectile mathematics were rudimentary, and the imperfect mobility of the guns crippled their usefulness in battle—once they had fired a few rounds in advance of the troops to clear a path and cow the enemy, their service was nearly at an end, as they could not fire when their own troops were in front of them nor move in front or flank to avoid them (the battle of Pavia was lost by this); and were regularly captured and retaken as either side gained ground. Francis I., however (1515-47), lightened their make and took care to secure the best draft horses, and won Marignano (1515) with them; Louis XII. (1498-1515) owed much of his success in the Italian wars to this arm; and Charles V. (1519-55) shared in its development, his Netherland subjects being so forward in it that Henry VIII. employed Dutch gunners to instruct his men. The use of cast bronze, giving surer bore and calculability, as well as lightness for a given power, became common; the bell-shaped mortars gave place to 18-pound culverins for siege work, and to 2's, 4's, 6½'s, and 8's (called falcons, falconets, and sakers) in the field. The great difficulty of carriages also,—to find one easily drawn yet stable enough to fire from,—was partially surmounted; and in Holland the miscellaneous calibres and classes of cannon were reduced to four—6's, 12's, 24's, and 48's. The Dutch and Huguenot religious wars in the latter part of the century developed the rudiments of a genuine system of artillery tactics, the use of the arm in connection with other arms as part of a tactical whole.

The first half of the 17th century is the first great landmark in the history of artillery. Henry IV. of France in his later years (d. 1610) occupied himself greatly with it; his minister Sully was master-general of artillery, and turned out over 400 pieces; and Maurice of Nassau (1584-1625), son of William the Silent, was much concerned with it. But its re-creator was Gustavus Adolphus (1611-32), who made it almost the centre of his system of warfare. Seeing that weight of ball was of minor consequence with the human body as a target, or length of range at close quarters, he devoted his whole attention to securing mobility and rapidity of fire. The former he obtained by putting nothing above a 12-pounder into the field, and by having a very light gun constructed, the fact that it would bear but a small charge being immaterial; it was made of a "thin cylinder of beaten copper, screwed into a brass breech, strengthened with four iron bands," the whole covered with mastic, cords, plaster, and finally boiled and varnished leather. It was called the *kalter* or the "leather gun," and could be drawn

about by the two gunners who served it. But the light charge it could bear made its range too short for the best results, and later it was replaced by a four-pound iron cannon, drawn by two horses. He had also heavier guns to beat down defenses, which in retreat he protected by the lighter ones. Rapid fire he secured by inventing the cartridge instead of pouring in powder, and his cannon could be fired faster than the ordinary musket. The *kalter* guns were first introduced during his Polish wars; in the Thirty Years' war his success was greatly helped by his improved artillery against the Imperialists' clumsy weapons and methods. At Breitenfeld (1631), Tilly's guns were mainly 24-pounders requiring 20 horses each and 12 for the wagons, could hardly be moved in action, and were almost at once silenced by the advance of their own troops; at the Lech (1632) Gustavus converged 72 pieces on the enemy at the river bend and made a crossing practicable; at Lutzen (1632), Wallenstein's batteries were practically stationary, Gustavus had heavy ones on his wings and centre and moving with them. He attached two guns to each regiment, under the colonel's orders—the "battalion system," but whose defect of dispersion of guns he corrected by also massing strong batteries to concentrate a crushing fire where needed; and he raised the total proportion of guns to 6 per 1,000 men, fully double that of any other nation. He also first saw that field and garrison service were essentially distinct, and separated the two branches of artillery not only in material but men. In England during this century, though the leather guns were used by the Scotch in 1640 on the invasion of England, and the Parliamentary army was crushed at Roundway Down (1643) by artillery, it remained in a comparatively undeveloped state, owing to the lack of the constant wars of the Continent; the complaint was made that there were no expert gunners in England.

In the latter part of the century, the perpetual wars of Louis XIV. led to a still further development of this arm. Even in the first part of his reign it was in a very primitive condition. The artillery officers had no functions whatever in time of peace, their nominal offices being purely titular; Vauban protested against this, but it was not remedied till Vallière's reforms of 1732. In 1671, however, Louvois first established a permanent organization for it, creating a regiment of artillerymen consisting of gunners and workmen, and establishing schools of instruction. The calibres were reduced in number and made uniform—those left (4's, 6's, 8's, 12's, 18's, 24's, and 32's) remain in use still, some of them rifled; bronze and iron were both used; carriages were much improved, made of wrought iron and provided with limbers, a special one invented for coast artillery, and platform wagons introduced. The development under him, however, was more in siege than field artillery. The Dutch and English introduced howitzers (a gun with a powder chamber smaller than the bore, for horizontal shell-firing, combining something of cannon accuracy with mortar calibre), mortars, and explosive shells, both hand and gun; and used canvas cartridges and grape-shot (several iron balls in a canvas case). The Woolwich arsenal was established in 1672. In 1682 the gunners were for the first time put un-



ARTILLERY DRILL—THE FORMATION OF THE HOLLOW SQUARE.



ARTILLERY DRILL.



ARTILLERY DRILL—PREPARING TO MOVE GUNS.



ARTILLERY

der military discipline, their function being previously considered that of civil artisans, and indeed the master gunners were carried on the civil establishment till 1783; in 1794 it was still thought needful to give the ordnance officers express authority over the gunners, by commission. William III. (1689-1702) formed the first English regimental artillery establishment, in place of detailing men from other arms as needed. England, however, was relatively backward.

The first half of the 18th century saw great extension of the specializing in this arm, and the quality of its items; but not very much invention. In France, Vallière the elder, a practical artillery general of immense ability, made great improvements; he reduced the calibres to five; lengthened the pieces, on the ground that short ones had less range and less accuracy, less ricochet and greater recoil, took more munitions and transport for equal service, and could not be used in sieges; he also greatly extended the training schools, and the continued practice of the arm in time of peace. Less usefully, he fought with success against separating the field artillery from the engineers, as involving two artillery trains instead of one. In England, Marlborough used it with effect as it was; the "Royal Regiment of Artillery" was formed in 1716 (the present body in 1722), and in 1741 the Royal Military Academy was instituted at Woolwich. The manufacture and service were both greatly improved; the English artillery was noted "for its lightness, elegance, and the good quality of its materials." The guns in use at the middle of the century were 24's, 12's, 6's, and 3's, in "brigades" (batteries) of four, five, and six guns, divided into light and heavy brigades; each field gun drawn by four horses, the two leaders driven by artillerymen. In Frederick's wars, the English artillery won great distinction. Frederick himself hardly valued this arm at its full value till the melting away of his trained soldiers compelled him to rely upon it more and more. This was perhaps rather from the extremely poor state in which his father left it, than from lack of understanding; that he realized at least a part of its defects and its importance is shown by the fact that finding the gunners and engineers mostly mechanics of inferior grade, he at once drafted the worst of them into garrisons, replacing them with men of competence and position; and as they had no commissions, and were consequently scorned by the other arms of the service, he gave the officers commissions and extra pay, and ranked them with officers of the guards. But his father had given all his attention to the drill and discipline and physical magnitude of his soldiers, to the neglect of the artillery, which at his death consisted of only one battalion of field and one of garrison, of six and four companies respectively; and Frederick inherited his general policy, though with a larger mind. His artillery was vastly inferior to the Austrian, raised to a pre-eminent position by Prince Lichtenstein. There were two pieces to a battalion, directed by a corporal without independent authority, and the battalion commander had enough on his mind without attending to artillery, which were expected always to keep a certain distance in advance of the troops, thus scanting their time to fire during an advance, and were usually cap-

tured in a sudden retreat from lack of time to limber up. Still they did good service at Rossbach, Hochkirchen, and Leuthen; and Frederick raised the proportion of guns to men, and in 1759 formed the first battery of horse artillery, of 6-pounders and 7-pound howitzers—placing great reliance on howitzers, making much use of them against intrenchments, and after the war attaching 40 heavy pieces to each corps. With only 2½ or 3 guns per 1,000 at the outset, he ended with 5 or 6; he created a horse artillery almost as rapid as cavalry; and although at the beginning of the Seven Years' war he had made the error Gustavus avoided, of using too heavy pieces in the field, he grew to appreciate mobility better, and gradually replaced them by lighter ones, saving the others for siege and garrison guns. His wars made three important changes in artillery tactics: the distribution of small batteries at important points in place of concentrating large ones on centre and flank; the preparation for an advance and the protection of deploying columns by light guns; and the rapid change in position of batteries, made possible by the horse artillery. The latter was employed by the Russians also, each regiment having three howitzers with mounted gunners.

The greatest artillery result of Frederick's wars, however, was in France. This country had been very backward in that arm since Louis XIV's time, ammunition and transport being especially crude. In 1765 Gen. Gribeauval, termed the "father of the modern artillery system,"—who had held an artillery command under Lichtenstein in the Seven Years' war, and admired the efficiency of the Austrian system,—undertook to reconstruct the French one from the bottom; for many years the fierce resistance he encountered made it impossible, though he succeeded in reorganizing the personnel; but in 1776 he became inspector-general of artillery, and carried through the rest of the most far-reaching reform ever effected in this arm, much of it permanent to this day. He divided it into field, siege, garrison, and coast artillery, with a separate class of material and separate personnel for each. For all material a uniform construction was adopted, tables of construction drawn up, and all possible parts made interchangeable. For lightness and consequent mobility, he made the pieces perfectly plain, reduced the length and weight of field pieces, which he restricted to 12's and under (guns in embrasures or behind parapets, of course, could not be shortened), reduced the charge, and therefore the necessary windage (the difference between the diameter of the projectile and that of the gun-bore). Field guns were limited to 4's, 8's, and 12's, and 6-inch howitzers. In ammunition the old grape and case shot were replaced by sheet-iron canisters holding cast-iron balls. Accuracy of fire was vastly improved by elevating screws and tangent scales, the latter based on the mathematical discovery that the path of a projectile is not flat. For siege and garrison guns he adopted at first the 12's and 16's, 8-inch howitzer, and 10-inch mortar; in 1785 the 8-, 10-, and 12-inch "gomer" mortar (with conical bore). The carriages were strengthened, lightened in draft, and improved in mechanism, and ammunition chests affixed; trunnion poles and the *prolonge* rope (to unite limber with trail, for firing in slow retreat) introduced, and the horses harnessed in pairs instead of tan-

ARTILLERY

dem; and the *bricole* devised—a collar with rope and hook to which the gunners and foot-soldiers harnessed themselves. A new ammunition wagon carrying fixed ammunition was built. Siege carriages had shafts in place of the field carriages' poles; garrison carriages, wheels in front and a truck in the rear; for coast service there were traversing platforms, with bolt in front and truck in rear on a circular racer. The field artillery was divided into regimental guns and corps or reserve artillery; the latter was subdivided into divisions of eight guns of the same calibre, and a company of artillery assigned to each brigade of four battalions. Eight pieces were also attached to the centre and to each wing. Horse artillery was not introduced till 1791, and horsemen and gunners were combined, each learning the other's work.

In the wars of the French Republic, in 1793, when the divisional organization was adopted, guns were attached to the divisions as well as to battalions; in 1796 Napoleon withdrew them from the latter and abolished the old "battalion system," to the great advantage of both arms, the infantry regiments being impeded by the guns and the guns ill served by the divided command. In 1800 he took the last step in professionalizing the arm, by establishing a driver corps of soldiers in place of outside teamsters. His only change in guns was substituting the 6-pounder of the 8's and 4's, and the use of a 24-pound howitzer, but his tactical improvements were great. He employed with enormous effect the modern system of massing gunfire on selected spots, and could not have won his prodigious victories without it, and like Frederick, as his soldiers were swept away he increased his artillery force, rising from $2\frac{1}{2}$ to about 4 per 1,000. His tactics are still part of the instruction of all soldiers.

The British began their long struggle against France very ill-equipped in all military points, and in none more so than artillery; guns, ammunition, transport, were alike crude and ill arranged, the whole equipment hardly able to move faster than foot pace. The field artillery was simply garrison artillery drafted into the field. Field and siege guns were intermingled, in batteries of 12, each battalion having two; the horses were in tandem of three, the drivers carters on foot. In the years before the Peninsular war (1808-14), however, Major Spearman had transformed it. Horse artillery was introduced in 1793; a battery consisting of two 9's and three 6's (later of 9's wholly), and a $5\frac{1}{2}$ -inch howitzer. A driver corps was formed in 1794, consisting of a few subalterns, non-commissioned officers, artificers, civilian drivers and horses—divided into "troops," one added to each company of foot artillery. Battalion guns were abolished in 1802, and six-gun field batteries organized, each of five 6 to 12-pounders and a $5\frac{1}{2}$ -inch howitzer; the drivers were to be soldiers; the horses were teamed in pairs, drivers on the off ones, and eight gunners carried on the limbers and wagons. The equipment was lightened and simplified, and ammunition well packed instead of flung into rough boxes. Excellent additions were made to material by the invention of shrapnel shell by Major Shrapnel in 1803, and by the development of the antique rocket from a mere fire-signal to a powerful engine of destruction, by Sir William

Congreve in 1806—the latter first used at Copenhagen in 1807, employed with great efficiency at Leipsic in 1813, in the Peninsular war at the Adour, and in the War of 1812 at Bladensburg.

Between 1815 and the Crimean war, the most considerable changes in material were the invention of a powerful 12-pounder howitzer weighing only 220 pounds, for mountain service, used with great effectiveness in the French campaigns in Algeria, the gun-carriage and ammunition going on muleback; the introduction in 1852 by Louis Napoleon—a hereditary artillery student, and the great work on artillery under his auspices is still a standard—of a 12-pounder to fire either solid shot or shrapnel, known as the "12-pounder Napoleon," and made the sole equipment of a set of field batteries, which did great service in his war of 1859 with Austria; and the application of rifling, though not efficiently developed till later, its use at Sebastopol being a failure. Carriages and ammunition wagons were also improved so that the gunners could ride on them, much increasing mobility; the trail was strengthened; and ammunition was carried in boxes on the limber. French field batteries, from 1827, consisted of four 12's and two 6-inch howitzers, or four 8's and two 24-pound howitzers. In England in 1820 the horses for guns and wagons were increased from six and four to eight and six respectively. In 1822, and in 1829 in France the driver corps was abolished, men being enlisted as "gunners and drivers," and distributed among the battalions; naturally it worked ill, few men being adepts in gunnery and horse management at once. In 1848 in England, the horse artillery was raised from the two guns, to which it had been skeletonized after 1815, to four, and in 1852 to six, as was the foot artillery; and 20 batteries were formed, several more being added in 1855. Even so, this arm was badly undermanned, and deficient in both number and weight of guns, in the Crimean war, where it was organized in position batteries, with 18's and 8-inch howitzers; heavy field, with 12's and 32-pounder howitzers; field, with 9's and 24-pounder howitzers; horse, with 6's and 12-pounder howitzers; and mountain, with 3's and 4-inch howitzers—each field and horse battery having a rocket section. The French organization was horse artillery, with mounted gunners; line or field, with gunners riding on the ammunition chests; and siege or reserve, with gunners on foot. As the war consisted mainly of the siege of Sebastopol, the field artillery had little scope, though used with notable effect at the Alma and Inkerman, and mortar fire causing a frightful destruction in the Redan at the end; and the relatively great increase of range and accuracy in small arms over that of artillery (not then effective at more than a mile) was making the heavier arm subordinate. Later inventions have restored the balance.

Breech-loading and rifling now come into prominence. The earliest cannon were breech-loaders, a system quicker to charge, easier to clean, and more accurate in adjustment of missile to bore, and thus needing less windage than muzzle-loading. But till lately, mechanical science was not equal to its requirements of nice adjustment, and muzzle-loading superseded it. The defect of smooth-bores, with their straight projectile motion, is inaccuracy at long ranges;

ARTILLERY

since, as a projectile's centre of gravity rarely coincides with its longitudinal axis, the farther it goes the more its unevenness of mass carries it out of the initial path. A whirling motion corrects this by constantly restoring the balance and carrying it the other way; and this is provided by spiral grooving of the gun channel, which was invented by a German early in the 16th century, but like the other system, was in advance of mechanical development. In 1846 it was for the first time practically applied to ordnance, and rifled siege guns were used against Sebastopol, but they were still too imperfect for efficiency. In 1858 rifled 12's and 4's were adopted by France, and in the Franco-Austrian war of 1859 were used with great effect, increasing the accurate range from 1,450 to 2,500 yards, or nearly double; while the Austrians, for generations pre-eminent not only for handling but material, had only smooth-bore 6's and 12's, and 32-pounder howitzers, with the lesser range. The nature of the country stunted the service of artillery, but it was well developed at Solferino and brilliantly handled by the French at Medole. In 1860 the introduction of the Armstrong rifled breech-loader, first used in the Anglo-Chinese campaign of that year, led to a transformation of English artillery equipment: 7-inch guns, 82 hundredweight, for siege and garrison service, 40's for position batteries, 20's for same or heavy field, 12's of 8 hundredweight for light field, 9's of 6 hundredweight for horse. Field carriages were provided with a gun-metal "saddle" worked by lever and hand wheel, with elevating screw. Ammunition wagons were replaced by separate ammunition columns.

At the outbreak of the American Civil War, the United States, largely owing to Lieut. Rodman of the Ordnance Department,—inventor of the Rodman gun, whose casting by interior cooling and consequent density of channel metal, and its thickness at the seat of charge, enable it to bear a heavier charge without bursting than any other,—headed the world in artillery material: both quality and manufacture were unsurpassed. In 1861 it cast a 15-inch Rodman, the most powerful weapon known; and a 20-inch smooth-bore firing a 1,080-pound shot. Otherwise its equipment was:—Field: wrought-iron rifled 3-inch, range 2,800 yards; bronze 6's and 12's; "Napoleon" 12's, range 1,500 yards, used very effectively within it all through the war; howitzers—12's, 24's, and 32's, and mountain 12's. Siege and garrison: Cast-iron rifled, 4½-inch; 12's, 18's, and 24's; howitzers, 24's and 8-inch; mortars, 8-inch, 10-inch, and bronze Coehorn (a small light mortar for throwing grenades). Coast (most of it at once turned into field batteries): 32's; 8-, 10-, and 15-inch Columbiads (for both shot and shell, like the Napoleons); 10-inch and 13-inch mortars. There were 18 calibres altogether—7 of "guns," 3 of Columbiads, 4 of howitzers, 4 of mortars. Eastern armies began with four 6-gun batteries to each division, about half of them being used as a corps reserve when corps were formed; later the batteries were reduced to four, and in 1863 taken from the divisions as formerly from the battalions, being formed into artillery brigades of 4 to 12 batteries. In the Western armies each infantry brigade had a battery of artillery till 1863, when as in the East a massing system was

begun. In the Confederate armies each division had an artillery battalion of four batteries, and each corps two battalions as a reserve. This combined system has been substantially adopted by other powers. The Civil War greatly advanced the importance of artillery, and developed the Napoleonic massing system.

The short Austro-Prussian war of 1866 gave no time for new developments in military science, and in artillery service the victorious Prussians were as usual far behind the Austrians, though their material was better. They used for the first time steel breech-loading rifled guns, nominally 6's and 4's, but using 15-pound and 9-pound oblong shells with percussion fuse; the Austrians had muzzle-loading rifled 8's and 4's, in batteries of eight, employing the brigade system and rocket batteries for the last time. After this war they adopted breech-loading guns, and armed themselves from Krupp's factories.

By the time of the Franco-Prussian war in 1870 the Prussians had made great advances in artillery, and owed a part of their success to their superiority to the French, both in numbers, power, and tactics of this arm. They disused reserve artillery, attaching the batteries to divisions and corps entirely; each cavalry division had two batteries of horse artillery; they pushed their guns well in advance, preparing the way for infantry movements by concentrated fire on an objective point, and firing with deliberation at ranges from 650 to 3,300 yards; while the French wasted their fire at too long ranges, held it too long in reserve, and used it in small batteries instead of masses. Their mitrailleuses, first employed in this war, were a disappointment, though they inflicted great losses on the Prussians in carrying positions, especially when successfully masked, and clearly marked out the great future of machine guns; but for offensive work against field artillery they were not fitted. The Prussians used steel breech-loading 9's and 4's, 3.7 guns per 1,000; the French, muzzle-loading 8's and 4's, with some "Napoleon" 12's, 3 to 1,000.

In the Russo-Turkish war of 1878 nothing new of any sort was brought forward. The Turks had the better guns, the Russians much the greater number; the former used Krupp's steel breech-loaders of 3.2 and 3.5 inches, 2.2 per 1,000 men, the latter bronze breech-loading 9's and 6's, 3.9 per 1,000. In the Spanish-American war of 1898 there was little use for artillery; and the only novelty was the furnishing of smokeless powder after Santiago, when it was no longer needed. A 3.2-inch steel breech-loader and a 3.6-inch field mortar were used. As the siege train was not used, its composition is immaterial. In the Philippines and China 3.2-inch field and mountain guns were used. In the Boer war, owing to the nature of the country and the operations, artillery played but a small part, and developed no new weapons; the Boers, however, had for years laid in a stock of much more improved material than the English.

See ARMAMENT OF THE WORLD; ARMY; ARMY OF THE UNITED STATES; ORDNANCE; PROJECTILES. For ammunition see AMMUNITION; EXPLOSIVES; GUNPOWDER. For the relations of the artillery arm to other services see COAST DEFENSE; FORTIFICATION; SIEGE WORKS; TACTICS.

ARTILLERY COMPANY — ARUNDELIAN MARBLES

Artillery Company, The Ancient and Honorable, a military organization of Boston, Mass. It was copied from that of London, was formed in 1637, and was the first regularly organized military company in America.

Artillery Company, The Honorable, the oldest existing body of volunteers in Great Britain. It was instituted in 1585, and comprises six companies of infantry, besides artillery, grenadiers, light infantry, and yagers. It furnishes a guard of honor to the sovereign when visiting London.

Artillery Corps, the official name of the entire artillery service of the United States army.

Artillery Schools are institutions established for the purpose of giving a special training to the officers, and in some cases the men belonging to the artillery service. An artillery school at Fort Monroe, Va., first established in 1823, discontinued, and re-established in 1867, gives instruction, both theoretical and practical. The artillery regiments of the regular army have each one foot-battery at the school. The course of instruction is one year, beginning 1 September, and it includes such subjects as ballistics, sea-coast engineering, electricity, mines and mechanisms, artillery, coast-defense, chemistry, explosives, etc. In Great Britain the artillery schools are at Woolwich and Shoeburyness. The Department of Artillery endeavors at Woolwich to give artillery officers the means of continuing their studies after completing the usual course at the Royal Military College, and of qualifying for appointments requiring exceptional scientific attainments. The school of gunnery at Shoeburyness gives instruction in gunnery to officers and men and conducts all experiments connected with artillery and stores. See **MILITARY SCHOOLS**.

Artist's Letters from Japan, *An*, a work by the noted American artist, John La Farge. The drift of the book is toward a purer art; but it contains much lively matter—accounts of the butterfly dance in the temple of the Green Lotus, and of fishing with trained cormorants. A thread runs through the letters, tracing the character and progress of the usurping Tokugawa family, from the cradle of their fisherman ancestors to the graves of the great shogun and his grandson in the Holy Mountain of Nikko.

Ar'tocar'pus, the generic name of the bread-fruit tree (q.v.).

Artois, ä'r'twä', the name of a former province of France anciently one of the 17 provinces of the Netherlands. It was bounded on the south and west by Picardy, on the east by Hainault, and on the north by Flanders. It is now almost completely included in the department of Pas de Calais. Artois is a fertile region, producing grain and hops. Its capital was Arras.

Ar'totype. See **PHOTOGRAPHY**.

Arts, the designation of branches of study in the Middle Ages, originally called the liberal arts to distinguish them from the servile arts or mechanical occupations. These arts were usually classed as grammar, dialectics, rhetoric, music, arithmetic, geometry, and astronomy. Hence originated the terms "art classes," "de-

grees in arts," "master of arts," still in common use in universities, the faculty of arts being distinguished from those of divinity, law, medicine, or science.

Aru. See **ARRU ISLANDS**.

Aruba, a-roo'ba, an island belonging to Holland, off the north coast of Venezuela. It is a dependency of Caracao and is about 30 miles long by 7 broad. The climate is healthy. Pop. about 7,700.

A'rum, a small genus of tuberous tropical and subtropical perennial herbs (commonly called callas) of the natural order *Aracea*, with simple leaves and diversely colored convolute spathes, for which they are cultivated either under glass or, in the case of some hardy species, in the open air, as ornamental plants. The naked topped spadices bear staminate flowers just above the pistillate ones at the bases. The tender species are managed like the fancy-leaved caladium (q.v.); the hardy must be planted in rich soil in cool, moist situations and must be well mulched during the winter. *A. maculatum*, lords-and-ladies, cuckoo-pint, wake-robin, from Europe, is, with its many cultivated varieties, perhaps the best known hardy species grown in America. The leaves and corms are acid; but the latter when ripe contain starch which may be extracted and used as a food. In places where it abounds it has long been converted into a kind of arrow-root and has been proposed as a substitute for the potato, but the corms are too small for profitable culture. Some closely related native American plants of somewhat similar habit are skunk cabbage (q.v.), water calla (see **CALLA**), Indian turnip (see **JACK-IN-THE-PULPIT**). *Anthurium*, a well-known genus of greenhouse plants, is also nearly allied.

Arundel, ä'r'un-dël, **Thomas**, an English prelate, third son of Richard Fitz-Alan, Earl of Arundel: b in 1352; d. Canterbury, 19 Feb. 1413. He was Chancellor of England and Archbishop of Canterbury. He concerted with Bolingbroke to deliver the nation from the oppressions of Richard II, and was a strenuous opponent of the Lollards and followers of Wyclif.

Ar'undel, Thomas Howard, Earl of. See **ARUNDELIAN MARBLES**.

Arundel, a small town in Sussex, England, famous as containing Arundel castle, the family seat of the dukes of Norfolk. It is on the small river Arun and has a showy Roman Catholic cathedral erected by the Duke of Norfolk. Pop. (1901) 2,738.

Ar'undel Society, a society instituted in London in 1848 for promoting the knowledge of art by the publication of facsimiles and photographs. It was named for the collector of the Arundelian Marbles.

Ar'undel'ian Marbles, a series of sculptured marbles discovered by William Petty, who explored the ruins of Greece for Thomas Howard, Earl of Arundel, in the reign of the first Stuart kings, James I and Charles I, and devoted a large portion of his fortune to the collection of monuments illustrative of the arts, and of the history of Greece and Rome. These marbles arrived in England in the year 1627, with many statues, busts, sarcophagi, etc. John Selden published some of the inscriptions which he thought most interesting, under the title of

ARUNDO — ARYAN RACE

'*Marmora Arundeliana*' (1628). Henry Howard, Duke of Norfolk, grandson of the collector, presented them in 1667 to the University of Oxford, where they still remain. The whole collection of inscriptions was published by Humphrey Prideaux in 1676; by Michael Maittaire in 1732; by Chandler in 1763. These inscriptions are records of treaties, public contracts, thanks of the state to patriotic individuals, etc., and many of a private nature. The most curious and interesting is one usually known by the name of the Parian Chronicle, from having been kept in the island of Paros. It is a chronological account of the principal events in Grecian, and particularly in Athenian history, during a period of 1318 years, from the reign of Cecrops (1450 B.C.) to the archbishop of Diognetus (264 B.C.). The authenticity of this chronicle has been called in question, but has been vindicated by many of the most learned men.

Arun'do, a genus of grasses. See REED.

Arus'pices, Roman priests and prophets, who foretold events from inspection of the entrails of sacrificed animals. They observed, too, all the circumstances which accompanied or happened during the sacrifice; for example, the flame, the mode in which the animal behaved, the smoke. Their origin is to be sought for in Etruria. They were introduced into Rome by Romulus, where they flourished till the time of the emperor Constantine (337 A.D.), who prohibited all soothsaying on pain of death.

Arus'pices, *On the Reply of the*, an oration by Cicero. After Cicero's recall from exile different prodigies alarmed the people of Rome. The auspices being consulted, answered that the public ceremonies had been neglected, the holy places profaned, and frightful calamities decreed in consequence. Thereupon Clodius denounced Cicero as the cause of the misfortunes that menaced the city, and on the following day the orator replied in the Senate to the attack. The speech takes rank among the greatest of Cicero's orations, though he had little time for preparation, and suffered under the disadvantage of addressing an audience at first openly unfriendly.

Aruwimi, a'roo-wē'me, a river of equatorial Africa having its source in the hills to the west of Albert Nyanza and tributary to the Congo. Its length is a little over 800 miles and its breadth at its confluence with the Congo is about a mile. It is navigable up to Yambuya, but beyond that place there are many rapids. In its upper course it is called the Ituri. Stanley discovered its mouth in 1877 and traced a considerable part of its course in his search for Emin Pasha in 1887.

Arvak, ār'vak, in Norse mythology, one of the horses attached to the chariot of the sun.

Ar'val Brethren (*fratres arvales*), a college or company of 12 members elected for life from the highest ranks in ancient Rome, usually at the emperor's nomination. They were so called from offering annually public sacrifices for the fertility of the fields.

Arve, ärv, a river tributary of the Rhone, which it enters near Geneva after a course of about 50 miles. It flows through the valley of Chamouni, and many of the most famous resorts of Switzerland are found in its vicinity.

Arvic'ola, a genus of rodent mammalia belonging to the family *Castoridae*, though they have also close affinities with the *Muridae*, or mice.

Aryan (är'yän, or är'ī-än) **Languages**, an important language family frequently styled the Indo-European or Indo-Germanic family of tongues. They have reached a higher development than those of the second great family, the Semitic, and are far in advance of the next one—that comprising the Turanian tongues. Like the Syro-Arabian forms of speech they are inflectional; while those of Turanian origin are only agglutinate. Max Muller separates the Aryan family of languages primarily into a southern and a northern division. The former is subdivided into two classes: (1) The Indic; and (2) the Italic; and the latter into six: (1) The Celtic; (2) the Italic; (3) the Illyric; (4) the Hellenic; (5) the Windic; and (6) the Teutonic. It is often said that Sanskrit, spoken by the old Brahmins, is the root of all these classes of tongues. It is more correct to consider it as the first branch and assume the existence of a root not now accessible to direct investigation. As an illustration of the affinity among the Aryan tongues the common word daughter may be instanced. It is in Swedish, *dotter*; Danish, *datter*; Dutch, *dochter*; German, *tochter*; Old Hebrew German, *tohtar*; Gothic, *dauhtar*; Lithuanian, *duktere*; Greek, *thygater*; Armenian, *dustr*; Sanskrit, *duhitri*; the last-named word signifying primarily "milkmaid," that being the function in the early Brahman or Aryan household which the daughter discharged. Not only are the roots of very many words akin throughout the several Aryan tongues, but (a more important fact) so also are the inflections. Thus the first person singular of a well-known verb is in Latin, *do*; Greek, *didomi*; Lithuanian, *dumi*; Old Slavonic, *damy*; Zend, *dadhami*; Sanskrit, *dadami*; and the third person singular, present indicative of the substantive verb is in English, *is*; Gothic, *ist*; Latin, *est*; Greek, *esti*; Sanskrit, *asti*.

Ar'yan Race, a name of comparatively recent application, the ethnological division of mankind otherwise called Indo-European or Indo-Germanic. It includes two branches, an eastern and western. The western comprises the inhabitants of Europe, with the exception of the Turks, the Magyars of Hungary, the Basques of the Pyrenees, and the Finns of Lapland; the eastern comprehends those of Armenia, Persia, Afghanistan, and northern Hindustan. From a multitude of details it has been established that the original mother tongue of all these peoples was the same. It is supposed that the Aryan nations were at first located somewhere in central Asia, probably east of the Caspian and north of the Hindu Kush and Paropamisian Mountains. From this centre successive migrations took place toward the northwest. The first swarm formed the Celts, who at one time occupied a great part of Europe; at a considerably later epoch came the ancestors of the Italians, the Greeks, and the Teutonic people. The stream that formed the Slavonic nations is thought to have taken the route by the north of the Caspian. At a later period the remnant of the primitive stock would seem to have broken up. Part passed southward and became the dominant

ARZACHEL — ASBEN

race in the valley of the Ganges, while the rest settled in Persia and became the Medes and Persians of history. It is from these eastern members that the whole family takes its name. In the most ancient Sanskrit writings (the Veda) the Hindus style themselves Aryas, the word signifying "excellent," "honorable," originally "lord of the soil."

Ar'zachel, a Jewish astronomer: b. in Spain about 1050. He discovered the obliquity of the ecliptic and compiled certain astronomical tables known as the "Toledo Tables."

Arzamas, a Russian town, the capital of a district of the same name, 340 miles east of Moscow. It possesses brickyards, tanneries, and tallow factories, and in the earlier half of the 19th century was distinguished for a school of painting which furnished the greater part of Russia with ikons or sacred pictures.

As, a word which the Romans employed in three different ways: to denote (1) any unit whatever considered as divisible; (2) the unit of weight, or the pound (*libra*); (3) a coin. The *as*, whatever unit it represented, was divided into 12 parts, or ounces (*unciae*). Scholars are not agreed on the weight of a Roman pound, but it was not far from 237.5 grains avoirdupois, or 327.1873 grammes, French measure. In the most ancient times of Rome the copper coin which was called *as* actually weighed an *as*, or a pound, but in 264 B.C. was reduced to 2 ounces, in 217 to 1 ounce, and in 191 to ½ ounce. In 269 B.C., when silver money was first struck by the Romans, the *as* was superseded as a money of account by the sestertius coined from the more precious metal.

As It Was Written, the title of a romance by Sidney Luska (Henry Harland), the scene of which is laid in modern New York. Sombre and tragic though it is, the romance shows unusual vigor of conception and execution and extraordinary intuitive knowledge of the psychology of the Jewish race.

As You Like It, the title of one of Shakespeare's comedies. Its realism lies in its gay, riant feeling, the fresh woodland sentiment, the exhilaration of spirits that attend an escape from the artificialities of society. The characters all meet in the forest of Arden, where "as you like it" is the order of the day.

A'sa, the third king of Judah. During the first 10 years of his reign his kingdom enjoyed peace and prosperity, but in the 11th year he was attacked by the Ethiopian king Zerah at the head of a vast army, which he completely routed. On his triumphant return Asa was met by the prophet Azariah, who encouraged him to persevere in the extirpation of idolatry. In the 36th year of Asa's reign Baasha, king of Israel, occupied Ramah, and proceeded to fortify it as a frontier barrier. Asa called in the aid of Benhadad, king of Syria, and recovered the city, but incurred the rebuke of the prophet Hanani for seeking help elsewhere than from the Lord. The incensed king threw the prophet into prison. He died after a prosperous reign of 41 years.

Asaba, a-sā'ba, a town in west Africa, on the Niger River, 150 miles from the coast. It is the seat of the supreme court, and contains the central prison, civil and military hospitals, and other public buildings. It is a place of large

present importance, and in the evolution of new English interests in Africa may become still more conspicuous.

As'afœt'ida is a gum resin obtained from the root of *Ferula fatida*. Although the United States pharmacopœia limits the producing plant, it is quite probable that asafœtida is obtained from two or even three or four species of *Ferula*, *F. narthex*, *F. fœtidissima*, *F. jascckeanum*. The main sources, however, are *F. fatida* and *F. narthex*. These are coarse herbs of the *Umbelliferae* family distributed throughout the eastern Asiatic provinces from Persia, Turkestan, Afghanistan. The root is cleaned from the leaves and while growing is cut off close to the ground. This is then covered with leaves and in five or six weeks a slice is cut off, and from the cut surfaces the juice exudes. This on thickening forms the asafœtida of commerce. The chemical composition is complex. It consists of resin, gum, ethereal oil, vanillin, and ferulic acid. Asafœtida is highly prized in the East as a seasoning. In medicine it is stimulant to the sympathetic nervous system and is an excellent carminative, and stimulant of unstripped muscle fibre. It is particularly valuable in expelling flatus from the peristalsis it induces. It is also used in hysteria, but in an empirical fashion. Its further study is desirable.

Asa'ma-Yama, a-sā'ma-yā'ma, an active volcano of Japan about 50 miles northwest of Tokyo, 8,280 feet high. Its latest destructive eruption was in 1783.

A'saph, the Levite and psalmist whom David appointed as leading chorister in the temple. It is supposed that his office became hereditary in his family, or that he founded a school of poets and musicians called, after him, "the sons of Asaph."

As'arabac'ca, a European herb. See ASARUM.

As'arum, a small genus of herbs of the natural order *Aristolochiaceae*, widely distributed in rich, shady woods throughout the northern hemisphere. They have odd chocolate or purplish, bell-shaped, three-lobed perianths containing 12 horned stamens. The flowers which are borne close to or upon the ground are hidden by the kidney-shaped or heart-shaped leaves. *A. canadense*, wild ginger, or Canada snake-root, is warmly aromatic and is sometimes used as a spice. It is common in the eastern United States and is often cultivated in wild gardens as are also the following species: *A. virginicum*, *A. arifolium*, both common from Virginia southward; *A. caudatum*, a Pacific coast species, *A. lemmoni* and *A. hartwegi*, both of the Sierra Nevada Mountains, the last found at altitudes of 4,000 to 7,000 feet. *A. europæum* is also cultivated. It was formerly used as an emetic, a role now played by ipecacuanha. Its leaves are still made into snuffs and are deemed efficacious as counter-irritants.

Asben, as-bēn', a kingdom of Africa, in the Sahara, with an area of about 49,000 square miles. It consists of a succession of mountain groups and valleys and attains in its highest summits a height of over 6,000 feet. The valleys, though separated by complete deserts, are very fertile. The climate is on the whole

ASBESTOS

healthy, and not unsuitable for Europeans. The principal vegetable productions are millet, wine, dates, senna, indigo, and various kinds of vegetables.

Asbestos, one of the most remarkable substances found in nature. It is a peculiar species of the hornblende family of minerals. Its composition is chiefly silica, magnesia, alumina, and ferrous oxide, and consequently unconsumable, hence its name. The fibres formed by the chemical combination above given are perfectly smooth, and in this respect are different from all other known fibres. Paradoxically, it is the link which completes the chain between the vegetable and mineral kingdoms, and is in fact a mineralogical vegetable possessing the curious properties found in both, for it is at once fibrous and crystalline, elastic and brittle, heavy as a rock in its crude state, yet as light as thistledown when treated mechanically. Added to this, its fibres, soft, white, and delicate, have, by their inherent quality of indestructibility, withstood the action of the elements since the world began; and through all the countless ages, during which the hardest rocks surrounding it have been reduced, this mineralogical mystery has remained intact, having successfully resisted the assaults of fire, acids, and time. Asbestos is found widely distributed throughout the world, although the principal supply of crude asbestos suitable for the manufacture of fireproof cloths and curtains comes from Canada, about 75 miles from Quebec. The Italian mineral has a fine, silk-like fibre, but is lacking in the essential characteristic of strength. The product obtained from South Carolina has a soft, woody, yellowish fibre, which quickly powders under pressure. The South African asbestos, as one might naturally infer, is of a dark slate or black color, with exceptionally long, strong fibres, but owing to its stiff and horny texture, it cannot be manufactured into a fine fabric, hence the superiority of the Canadian asbestos, and its large consumption in the United States.

The mining of asbestos differs radically from the mining of other minerals, since no shafts are sunk, but excavations are made in the open, somewhat after the manner of a stone quarry. Canadian asbestos, however, is found in narrow veins or seams about an inch and a quarter in thickness, and embedded in rock which is easily severed from it. The strata of asbestos, which may be vertical or horizontal, are found in practically detached deposits, and are as elusive as those of zinc-bearing ore, and can only be determined by exploring for them. The rock to which the mineral is attached shows on fresh fracture a serpentine mineral of a green shade containing finely divided particles of chromic and magnetic iron. The asbestos on cleavage presents a brilliant, dark-green surface by reflected light, but the fibres after they are detached are perfectly white. The act of separating the mineral from its matrix of rock is termed "hand cobbing," and after this process the mineral is shipped to various factories in the United States.

The process of manufacture begins by placing the asbestos mineral in a chaser mill, a machine comprising a rotating edge-wheel revolving at the end of a radial arm in a trough, which crushes the mineral, dividing the fibres without destroying them. The result is a snowy mass of mineral wool ready for winnowing, a

method of removing the minute particles of rock still clinging to the fibres very much like the winnowing of grain; this is done by means of a blast of air, which separates and blows away the foreign matter, leaving the fibres in a refined state and in proper condition for the third stage of manufacture. This is termed air fibre raising, and as the name implies, the fibres are raised by a current of air produced by a blower of large dimensions through a vertical pipe inclined at a small angle. The object of this procedure will be obvious, when it is stated that the air blown across the fibres causes those of coarser texture to be deposited in a compartment near the bottom of the pipe. The medium fibres will be projected a little higher, and these will fall into a second compartment. The finer fibres will be blown to a higher point, and there collected, while the dust will be carried to the top and deposited. The fibres are in this way sorted into different lots according to their texture, and are ready to be made into articles for which they are best adapted. The fluffy stuff now goes to the carding room, just as though it were genuine wool sheared from a sheep or pure cotton fresh from the plant on which it grows, instead of a mineral substance that in its original state was mined like a lump of anthracite coal. A carding machine, similar to that employed in preparing wool, cotton, or flax fibres before spinning, has been adopted by the manufacturers. The problem of mechanically combing these fibres was no small one, and the carding takes place in a machine having a large central rotating cylinder covered with card clothing, that is, strips of leather set with projecting wires termed teeth. Around the main cylinder there are a number of smaller cylinders, also provided with card clothing, which engages the teeth of the central cylinder rotating in the reverse direction. This machine straightens out the fibres and lays them parallel; after passing through the first breaker, they are fed into a second carding engine or breaker, which is set to a finer gauge than the preceding. A third and last carding process takes place in a machine called a finisher or condenser, when all the irregularities are eliminated, and the fibres are stripped from the final cylinder by means of a fly-comb and are converted into unspun threads, when they are delivered on a traveling apron or endless band, and are gathered into rows by reciprocating scrapers; they are then condensed, and the process is continued in the coiling cans. In spinning the yarn, the rovings are delivered to the spindles on a carriage, which then recedes, when the fibres are twisted, and returns when the spun asbestos yarn is wound on the spindles. The spinning frames do not draw the yarn, and no strain is placed on it until after it is twisted. This brings the manufacture of the fireproof material to a point where it is to be woven into cloth, packing, or other forms; for asbestos is used for divers other purposes than those appertaining to theatres.

While adulterated asbestos may be used in some of the mechanical arts, for theatrical hangings its purity should be 100 per cent; it then forms one of the safest barriers against the calamity of fire. As a matter of fact, much of that which is termed commercially pure asbestos cloth contains from 5 to 20 per cent of combustible matter, but absolutely pure Amer-

ASBJÖRNSSEN — ASCENDANTS

ican-made cloth may be obtained, where price is not a primary consideration. Not only is purity essential in asbestos cloth where used for protection against fire, but strength as well; and after asbestos is subjected to a high temperature, it has a tendency to powder, when, owing to its weight, it may break through, and its utility be impaired.

One of the leading manufacturers has made an improvement in weaving asbestos cloth for theatre curtains; it consists of two strands of asbestos spun around a strand of high-temperature-melting brass wire, so that the wire is completely embedded and concealed. These asbestos metallic strands form the warp, so that the threads run the long way of the cloth when finished. The weft, or filling-in cross threads, is made of plain, pure asbestos. Such a curtain will stand well under a severe high-temperature test without breaking. Not only theatre curtains, but set scenery of all kinds may be constructed of asbestos. Scenic artists find it more difficult to paint, but the finer textures may be utilized for this purpose; and although asbestos cloth does not take colors as satisfactorily as cheese cloth and burlap, yet its use should be provided for wherever audiences are to be assembled. Flooring and woodwork in general may be easily replaced by compressed asbestos fibre board, and it has been shown that the latter may be stained, polished, and finished to as high a degree as wood. All the upholstery should be of pure asbestos cloth, and carpeting is also made to take the place of the combustible vegetable and animal fibres now used so extensively. One of the peculiar properties of asbestos carpeting is that the longer it is in service, the tougher it becomes.

Asbestos is utilized in the arts in many other forms than cloth; it may be worked into a pulp, and a fireproof paper is obtained. This paper is now used on roofs, between walls, flooring, etc. Fireproof rope three eighths inch in diameter for the suspension of curtains and other uses is made, having a tensile strength of 1,650 pounds per foot. High-grade asbestos plaster is fireproof, soundproof, and hangs together with great tenacity when subjected to water. Asbestos mineral with rock as it comes from the mine costs \$200 per ton, but after it is stripped the long fibres are worth \$1,500 per ton. When these are made into cloth it sells for \$3 per square yard; when made into curtains, the sewing is done with asbestos thread.

Asbjörnsen, as-byörn'sën, **Peter Kristen**, a Norwegian folklorist: b. in Christiania, 15 Jan. 1812; d. there, 6 Jan. 1885. While pursuing botanical and zoological studies, and subsequently during various travels at government expense, he collected folk tales and legends, aided by his friend Jørgen Moe, with whom he published 'Norwegian Folk Tales' (1842-4); and 'Norwegian Gnome Stories and Folk Legends' (1845-8; 3d ed. 1870), pronounced by Jacob Grimm the best fairy tales in existence.

Asboth, ösh'böt, **Sandor (Alexander)**, a Hungarian-American soldier: b. in 1811; d. in 1868. He came to America with Kossuth in 1851, and became a United States citizen, serving in the Civil War in the Federal army, attaining the rank of a brevet major-general. He was United States minister to Argentina at the time of his death.

Asbury, äz'ber-i, **Francis**, the first bishop of the Methodist Episcopal Church in the United States. He was born in Handsworth, Staffordshire, England, in August 1745; d. in Spottsylvania, Va., 31 March 1816. He joined the local ministry of the Methodists at the age of 16, the itinerant ministry six years later, and was sent by John Wesley as missionary to America at the age of 25. In 1772 he was appointed by Wesley general superintendent of the connection in America, the duties of which office he exercised through the entire period of the American Revolution. Until the termination of the war, the Methodists of America had called themselves members of the Church of England, and their ministers laymen. They now considered the political changes of the country as separating them from that Church, and therefore established an organization for themselves. Francis Asbury was constituted the first bishop of the new Church (1784), which office he held till his death. During the 30 years of his episcopal labors he traveled annually from the Andros-coggin to the Gulf of Mexico, and from the Atlantic to the Mississippi, ordained not less than 3,000 preachers, and preached about 17,000 sermons. Identified with the religious interests of this country through the two great struggles which have so greatly modified our political and social character, he became eminently American in his sympathies and character, and left the mark of his native enthusiasm and energy upon the ecclesiastical history of the United States.

Asbury Park, N. J., a city and popular summer resort in Monmouth County, on the Atlantic Ocean, six miles south of Long Branch and 40 miles south of New York city. It is on the line of the Pennsylvania R.R. and the Central R.R. of New Jersey. It adjoins Ocean Grove on the north, being separated from it by Wesley Lake. It was founded in 1869, and given a city charter in 1897. It contains many hotels and boarding-houses, attractive summer dwellings, electric lights and street railways, a national bank, etc. It has a property valuation of more than \$3,000,000; and is rapidly becoming nearly as popular a winter as a summer resort. Asbury Park and Ocean Grove were originally laid out by members of the Methodist Episcopal Church for camp meetings and other purposes. Pop. (1900) 4,148; in summer, 25,000 and upward.

Ascalon, a ruined town of Palestine, on the sea-coast, 40 miles west-southwest of Jerusalem. It was noted during the Crusades, Godfrey de Bouillon gaining here a great victory over the Egyptians in 1099. Its site is now a complete scene of desolation.

Asca'nus, a son of Æneas and Creusa, who accompanied his father to Italy. He supported Æneas in his war with the Latins, and succeeded him in the government of Latium. His descendants ruled over Alba for 420 years. He is known also as Iulus.

As'caris. See ROUND-WORMS; THREAD-WORMS.

Ascend'ants, in law, the opposites to descendants in succession. When a father succeeds his son or an uncle his nephew, etc., the inheritance is said to ascend or to go to ascendants.

ASCENSION — ASCHAFFENBURG

Ascen'sion, an isolated volcanic island, near the middle of the South Atlantic Ocean, about lat. $7^{\circ} 55' S.$; lon. $14^{\circ} 21' W.$; area about 34 square miles. It belongs to Great Britain; is the sanatorium for the British West African squadron. There are about 400 inhabitants, mainly government employees and their families. Ascension is celebrated for its turtle, which weigh in many cases from 500 to 800 pounds. This island was discovered on Ascension Day, 1502, by the Portuguese, and hence its name; but it was never formally occupied by any nation till Great Britain took possession of it in 1815, after the transportation of Napoleon to St. Helena.

Ascen'sion, Right, a term employed in astronomy in allusion to the position of a star or other heavenly body. Such position is known when we know the right ascension and declination, these terms corresponding respectively to longitude and latitude as applied to the position of places on the globe. Right ascension is measured on the equinoctial or celestial equator, the first point of Aries being taken as the starting-point; and the right ascension of any star is the distance in degrees, minutes, and seconds from this point to the point where a great circle, passing through the star, cuts the equator. The right ascension is easily found by means of the sidereal clock, which, when the first point of Aries passes the meridian, gives the time as 0 hours, 0 minutes, 0 seconds. By noting on the clock the time at which the body is on the meridian, we obtain the right ascension in time, which may be converted into degrees, minutes, and seconds at the rate of one hour to 15° .

Ascen'sion Day, a religious festival of many churches in commemoration of the ascension of the Saviour and often called Holy Thursday. It is a movable feast, always falling on the Thursday but one before Whitsuntide. It does not appear to have been observed before the 4th century.

Asceticism is the exercise of the faculties in moral and religious practices, the application of St. Paul's comparison between an athlete's and a Christian's life (1 Cor. ix. 24, 27). It is negative, when the object of this exercise is to avoid evil, to curb vicious tendencies, moderate excessive passion, and deny the soul and body any indulgence which might become inordinate or unlawful, and whenever it implies active measures against such disorders as gluttony, sloth, anger, pride, and lust, by abstinence, fasting, watching, self-restraint, modesty, and habits conducive to continence. It is positive, when its object is the exercise or training in the virtues which perfect life, and the cultivation of the means most efficacious for this end, such as devout reading, especially of the scripture, meditation, prayer, examination of conscience, exertion, and sacrifice for the good of others, zealous promotion of good enterprises; in a word, anything that can help one to do what is best, constantly, unhesitatingly, and with facility. This is the aim of all true asceticism, whether based on the principles of natural or of positive and revealed law. This aim, as well as many of the means above enumerated, is found to some extent in Pagan and Jewish, as well as in Christian asceticism. The latter employs additional means of inculcating and developing

the habit of virtue, such as the religious life, divine worship, and in particular the sacramental system of the Church. Asceticism has some part in every rightly regulated life, even in one based on purely ethical principles; but in Christian life it is most systematic and far-reaching. The whole Christian economy depends on self-denial and the active pursuit of virtue according to fixed principles. Every sincere Christian is, accordingly, an ascetic, some are professedly so, men and women, whether in the conventual cloister or domestic circle, who strive to acquire by daily practice habits of virtue, and to advance in holiness. Naturally counsel and direction are needed in a matter so difficult, and it is for want of due attention to these that asceticism is often misunderstood, and is regarded by some as grotesque, a shield for certain excesses and extravagances, associated often with the external observances of communities like the Essenes, with the singularities of some hermits and anchorites, the frenzy of fanatics like the Flagellants, the exclusiveness of the Brahmins, the ablutions of the Mohammedan, the dream of men like those composing the Brook Farm Community. To appreciate asceticism in its normal exercise, one must study it in the examples of men and women noted for its exercise, or in the books whose guidance they followed, in works of the great ascetical and sermon writers, but chiefly in scripture, and in the life of Christ and of persons distinguished for holiness. See Kempis, 'Imitation of Christ'; Rodriguez, 'Christian Perfection'; Scaramelli, 'Ascetical Directory.'

Ascet'ics, a name anciently given to those Christians who devoted themselves to severe exercises of piety, and strove to distinguish themselves from the world by abstinence from sensual enjoyments and by voluntary penances. Hence those writings which teach the spiritual exercises of piety are termed ascetic writings. Even before Christ, and in the time of the early Christian Church, there were similar ascetics among the Jews, such as the Essenes, also among the philosophers of Greece, and in particular among the Platonics. The expression is borrowed from the Greek word *askēsis* (exercise), used to signify the spare diet of the athlete, who, to prepare themselves for their combats abstained from many indulgences.

Asch, äsh, a manufacturing town in the extreme northwest corner of Bohemia. It contains a large Protestant and a newly-erected Roman Catholic Church, a real-school, schools of design, weaving, etc. The inhabitants are mainly employed in cotton, woolen, and silk manufacture, bleachfields, and dye-works. Pop. (1900) 18,700.

Aschaffenburg, a-shā'fën-bürg, a town of Bavaria, 26 miles east-southeast of Frankfurt. The chief edifice is castle of Johannisberg, built in 1605-14. There is also the Pompeianum, an edifice built by King Louis of Bavaria, in imitation of the Casa del questore (commonly called the Castor and Pollux House) at Pompeii. The principal industries are the manufactures of colored paper, tobacco, and liquors. There are also large breweries, and an extensive trade is done in wine and timber. Aschaffenburg long belonged to the archbishops of Mainz. Pop. (1900) 18,091.

ASCHAM — ASCIDIAN

Ascham, ās'kām, **Roger**, an English scholar: b. Kirby, Wiske, Yorkshire, 1515; d. London, 30 Dec. 1568. While still a child, he was taken into the family of Sir Anthony Wingfield and educated with the latter's children. He made rapid progress in English and classical studies, and was taught archery by Sir Anthony himself. The same generous patron sent him in 1530 to St. John's College, Cambridge, where he read nearly all extant Latin literature, acquiring an elegant Latin style that proved most useful to him later, and developed an especial aptitude for Greek, which he taught to students younger than himself. Besides this, he paid some attention to mathematics, became an accomplished musician, and acquired remarkable skill in penmanship. He received his B.A. degree in February 1533-4, and became a Fellow of his college. His reputation for Greek learning soon brought him many pupils, several of whom later rose to distinction, and students from other colleges attended his lectures. In five years, he afterward said, Sophocles and Euripides had become at his college as familiar as Plautus had been previously, and Demosthenes was as much discussed as Cicero. The beauty of his handwriting and the purity of his Latin led to his being employed to write the official letters of the university. He took an active part in the controversy as to the correct mode of pronouncing Greek, opposing Sir John Cheke's system, but later adopting it. In 1543-4 he wrote his famous treatise on archery, 'Toxophilus,' and in person presented a copy of it to Henry VIII., who so approved of the work that he gave the author an annual pension of £10, which was renewed by Edward VI., whose Latin secretary Ascham became. In 1548 he was appointed tutor to Princess Elizabeth. He read with her all 'Cicero,' the greater part of 'Livy,' the 'New Testament,' in Greek, 'Isocrates,' 'Sophocles,' and portions of 'Cyprian' and 'Melancthon.' Two years later he was nominated secretary to Sir Richard Morysyn, ambassador to the Emperor Charles V. Their headquarters were at Augsburg, but Ascham made trips to Louvain, Halle, Innsbruck, Venice, and Brussels, visiting famous teachers and scholars. He lived on excellent terms with Sir Richard, reading Greek with him five days in the week. The death of Edward caused the recall of the embassy in 1553. Ascham became Latin secretary to Queen Mary and gave proof of his industry by writing for her within three days 47 letters to persons of high rank, of whom cardinals were the lowest in degree. With the accession of Elizabeth, he was continued in his offices and became in addition private tutor to the queen, reading several hours a day with her in the learned languages. She bestowed on him the prebend of Wetwang in York Cathedral 5 Oct. 1559. His last years were filled with anxiety and care due to domestic afflictions and pecuniary embarrassment. Between 1563 and his death he found relief in the composition of his best known work, 'The Scholemaster,' of which he completed two books. The first is a general discussion of education with arguments in favor of inducing a child to study by gentleness rather than by force. The second is an exposition of his famous method of teaching Latin, by means of "double translation," etc., a method which has received high praise from all subsequent writers

on the theory and methods of education. When Queen Elizabeth heard of Ascham's death, she is said to have exclaimed that she would rather have cast £10,000 into the sea than to have lost her tutor, Ascham. Scholars in England and on the Continent mourned for him, and expressed their grief in stately Latin verses. In English literature Ascham has a secure place on account of the strength and vigor of his English prose, highly Latinized though it was in construction and vocabulary. In an age when serious literary composition in English was cultivated but little, and regarded less, the famous words in his dedication of 'Toxophilus' to Henry VIII. sounded a noble and patriotic note. "Although to have written this booke either in Latin or Greeke . . . had been more easier and fit for my trade in study, yet nevertheless, I supposinge it no point of honestie, that my commodity should stop and hinder any parte either of the pleasure or profite of manie, have written this Englishe matter in the Englishe tongue, for Englishe men." His style is without the tricks that Lyby introduced, and has an easy flow and straightforwardness.

Bibliography.—By far the best edition of Ascham's writings is 'The Whole Works of Roger Ascham . . . with a Life by Dr. J. A. Giles' (3 vols. in 4 parts, Lond. 1864-5). This edition includes 295 Latin and English letters, many printed for the first time. 'Toxophilus' was first published in 1545; other editions appeared in 1571, 1589, 1788, 1821, 1865 (by J. A. Giles), 1868 (by E. Arber). 'The Scholemaster' was first issued 1570, and was followed by editions in 1571, 1572, 1573, 1579, 1583, 1589, 1711, 1743. Prof. J. E. B. Mayor published best modern edition in 1863, and E. Arber reprinted the first edition in 1870. The best exposition of Ascham's educational system is in R. H. Quick's 'Essays on Educational Reformers' (1868). Cf. also article by Sidney Lee in 'Dictionary of National Biography.'

Aschersleben, ā'sher-lā'bēn, a town of Prussian Saxony, in the district of Magdeburg. It is walled and entered by five gates, and contains several churches, a synagogue, and a real-school of the first class. There are manufactures of woolen goods, paper, sugar, artificial manures, earthenware, etc. Among several interesting ruins in the vicinity is the old castle of Askanien, the cradle of the house of Anhalt. Pop. (1900) 27,245.

Ascid'ian, a marine animal, so called from *Ascidia*, a genus of *Tunicata*. Ascidians were once regarded as mollusks, and afterward as worms, but when their embryology and early stages were studied and it was found that they passed through a tadpole-like stage, in which the tail is supported by a notochord, and that in other respects they approached the vertebrates, they were placed with the vertebrates in the group *Chordata*. The simple ascidians attain to a large size, *A. callosa* being about two inches in diameter, quite round, and in shape and color much like a potato. The "sea-peach" (*Cynthia pyriformis*) is of the size and general shape of a peach, with its rich bloom and reddish tints. It is common at a depth of 10 to 50 fathoms on both sides of the north Atlantic. While other forms, as *Bottemia*, are stalked and fixed to the bottom, certain pelagic forms, as *Pyrosoma*

ASCLEPIADACEÆ — ASELLIO

(q.v.) and *Salpa* (q.v.), are free-swimming. The compound ascidians, such as *Amaracium*, grow in white or reddish masses on sea-weeds, rocks, shells, etc., the individual animals being minute. The interesting form *Perophora* grows in bunches on piles and wharves on the southern coast of New England; it is perfectly transparent, so that the heart and circulation of the blood can readily be observed under the microscope. The heart is a straight tube, open at each end; after beating for a number of times, throwing the blood with its corpuscles in one direction, the beatings or contractions are regularly reversed, and the blood forced in an opposite direction. For a general account of the anatomy, development, and metamorphoses of these animals, see TUNICATA.

Asclepiada'ceæ, a natural order of more than 200 genera and 2,000 species of dicotyledonous herbs and shrubs, most of them with milky juice and many of them twining. The species are widely distributed in the temperate and tropical zones of both hemispheres and are especially abundant in Africa. They differ greatly in their characteristics and uses; some, like *Stephanotis floribunda*, are delightfully fragrant; others, like *Stapelia gigantea*, carrion flower, are repellantly odoriferous. Some species yield a fibre from their stems or their pods; some are used in medicine; others are planted for ornament. They are characterized by opposite or whorled, seldom scattered, entire leaves without stipules; umbels of symmetrical flowers, without calyx and with a five-parted corolla with often reflexed lobes; five stamens attached to the corolla and more or less united around the stigma; pollen grains more or less coherent; the ovary composed of two carpels; style short; stigma discoid; fruit a follicle or pod; seed flattened, with long silky hairs, which buoy it up in the air for dispersal; cotyledons flat. In the United States *Asclepias* (q.v.), or milkweed, is the principal genus. The more important genera are grouped as follows: TYLOPHOREÆ, *Marsdenia*, *Stephanotis*, *Cerepegia*, *Stephelia*, *Hoya*; GONOGLOBÆ, *Gonoglobus*; PERIPLOCHÆ, *Periplocha*, *Streptocaulon*; ASCLEPIADÆ, *Asclepias*, *Cynanchum*, *Vincetoxicum*.

Asclepiades, äs'kle-pī'a-dēz, the name of several ancient Greek writers—poets, grammarians, etc.—of whom little is known, as well as of several physicians, the most celebrated of whom was Asclepiades, of Bithynia, who acquired considerable repute at Rome about the beginning of the 1st century B.C.

Asclepias (milkweed, silkweed, swallow wort, the type genus of about 125 species of the natural order *Asclepiadaceæ* (q.v.), the species of which are mostly North American erect perennial weeds with thick, deep roots common in pastures and waste places. Some furnish a fibre strong enough for ropes, and the silky down attached to which is useless for spinning, is often used for stuffing pillows, etc. The young shoots of some species are occasionally cooked like asparagus, which they are said to resemble somewhat. *A. tuberosa*, butterfly-weed, pleuvisy root, common in dry banks and fields from Ohio to Georgia, is very showy and seems to deserve a place in the flower-garden. Other well-known American species are *A. rubra*, *A. purpurascens*, *A. syriaca*, etc. The few species

cultivated for ornament in America are mostly foreign. The genus is named in honor of the Greek god Æsculapius, since some of the species are reputed carminatives, sudorifics, and expectorants. Medicinally the milkweeds are of secondary value only. They are irritants, and cause nausea, vomiting, and diarrhoea. They also cause diuresis and diaphoresis, but their exact action is in need of investigation. The eclectic school have been the chief investigators.

Ascoli, äs'kō-lē, or **Ascoli Piceno**, äs'kō-lē pēchā'nō (the ancient Asculum), an Italian town, 90 miles northeast of Rome. The town, one of the most ancient in Italy, is well built, and contains many handsome edifices and noble mansions, and the remains of an ancient theatre, temples, etc. It has manufactories of woolen cloths, leather, hats, cream of tartar, china-ware, sealing-wax, paper, and glass. It has an active trade, and its port, at the mouth of the river Tronto, is much frequented by coasting vessels. Pop. (1901) 28,882.

Ascoli Satriano, äs'kō-lē sä'tre-ä'nō (anc. *Asculum Apulum*), a town of southern Italy, 20 miles south of Foggia. Pop. (1901) 8,550.

As'comyce'tes, a large and important group of fungi, so called from their spores being contained in asci or sacs. This group includes mildews, rusts, smuts, the truffle, the morel, and (according to Schwendener and other authorities) the lichens. See Engler and Prantl, 'Die Natürlichen Pflanzenfamilien.' See FUNGI.

Asco'nius (QUINTUS A. PEDIANUS), a Roman historian of the 1st century A.D., who wrote a life of Sallust, a reply to the critics of Virgil, and valuable commentaries to Cicero's orations, some of which are extant.

As'cot, a celebrated English race-course near the southwest extremity of the Windsor park. The annual races, which take place in the second week in June, are attended by the fashionable and sporting public. From the accounts of the Master of Horse for the year 1712, it would appear that they were instituted, not in 1727, as is commonly supposed, but by Queen Anne on 6 Aug. 1711.

Ascutney, äs-küt'nī, an isolated granitic mountain on the boundary between Windsor and Weathersfield, Vt. Its summit is 3,320 feet above tide-water; and from it is presented an extensive and beautiful prospect of the valley of the Connecticut.

As'dood, or **Asdoud**, a seaport of Palestine, on the Mediterranean, 35 miles west of Jerusalem. It was the Ashdod of scripture, one of the five confederate cities of the Philistines, and one of the seats of the worship of Dagon (1 Sam. v. 5). It occupied a commanding position on the high road from Palestine to Egypt, and was never subdued by the Israelites. It sustained against Psammetichus a siege of 29 years; was destroyed by the Maccabees, and restored by the Romans. It is now an insignificant village, from which the sea is constantly receding.

Aselli, a-sēl'lee, **Gasparo**, a famous Italian physician: b. Cremona about 1580; d. 1626. He was professor of anatomy and surgery at Padua, and in 1622 discovered the lacteal vessels, which he seems, however, never to have

ASELLUS — ASH

understood or described with complete accuracy. He left a treatise, 'De Lactibus' (1627).

Asellus, a fresh-water isopod crustacean, allied to the wood-lice (q.v.), common in ponds and standing water, under sticks and stones, and in open caves. These crustaceans differ from the common pill bugs of the land in having a pair of rather long forked two-jointed caudal appendages and antennæ of the second pair reaching to the telson. The body is broad and flat, with a broad shield-like telson, formed by the fusion of the last abdominal segments. There are six pairs of legs arising from the middle region of the body between the head and telson. The female carries her eggs under her breast, behind the head. Respiration is carried on by several pairs of broad, gill-like sacks appended to the broad, flat abdominal legs. Blind individuals occur in caves, which are allied to the true blind *Asellus caecidotæa*.

Asen, ä'sën, in northern mythology, the most powerful of the gods. They included 12 gods and the same number of goddesses, among the most renowned of whom were Odin, Thor, Baldur, Freyr, Frigga, Freyja, Idunna, Eira, and Saga. Their dwelling-place was Asgard. Though this worship was native only to the tribes of Scandinavia, its influence extended throughout ancient Germany, and may still be traced in many German proper names. Thus the German names of the days of the week, which through the Saxons became incorporated into the English language, are derived from this mythology. (See ASGARD.) Asen was also the name of several mediæval czars of Bulgaria.

As'enath, the daughter of Potipherah, priest of On, and the wife of Joseph (Gen. xli. 45, 50).

Asepsis. See ANTISEPTICS.

Asexual Generation. See PARTHENOGENESIS.

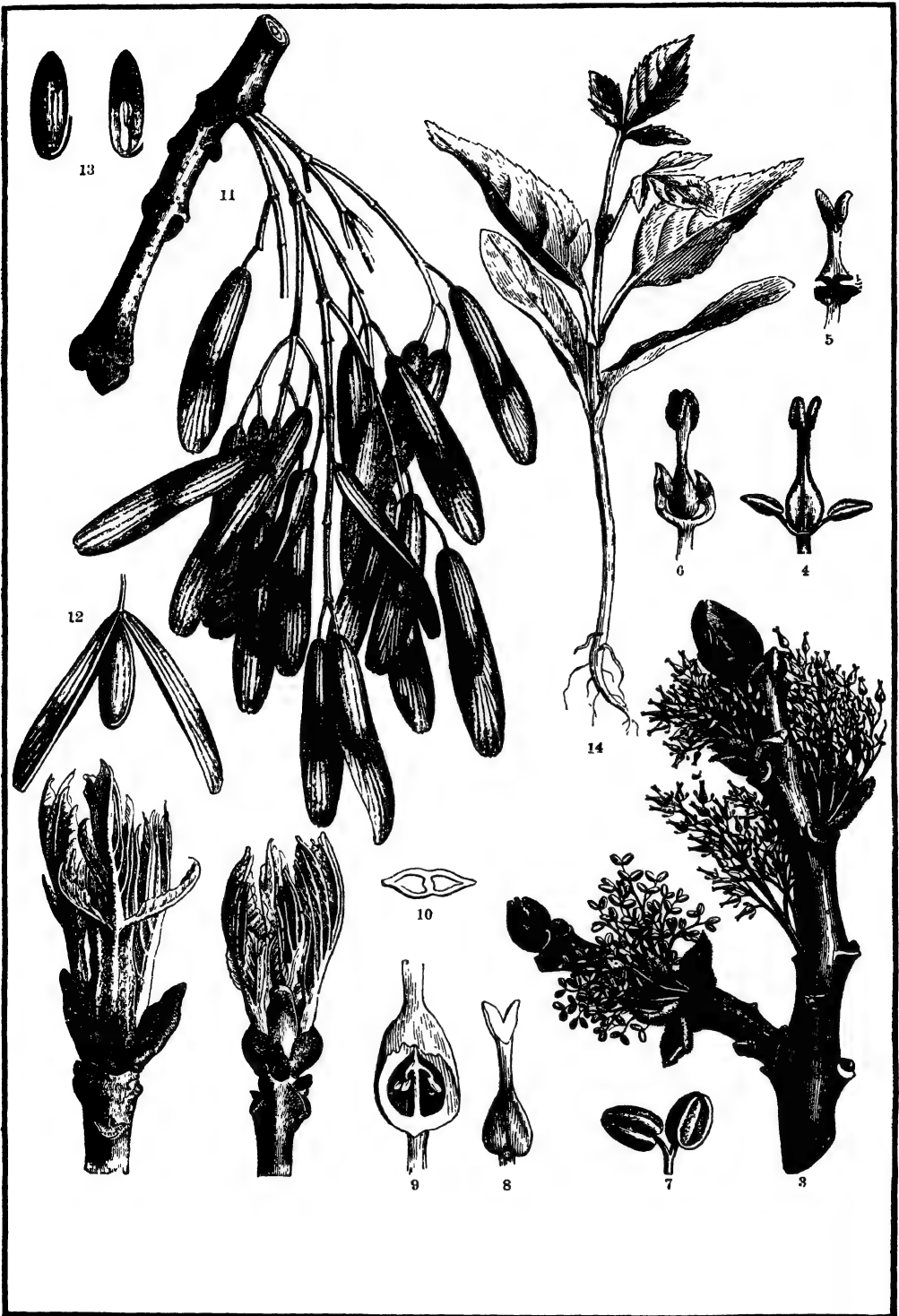
Asgard, äs'gärd, the home of the Æsir, or Asen, and the Olympus of northern mythology. The city of Asgard is fabled to have been built in the middle of Ida's plain, the very centre of the universe. Here the Æsir erected a court for themselves with seats for 12 and one high seat for Odin, the All-father, and also a lofty abode for the goddesses, called Vingolf. They worked diligently, played at games, were rich in gold and all precious things, and happy, till three maidens from Jotunheim, the giants' world, crossed Ida's plain and entered Asaheim, when corruption spread among its inmates. Asgard had many mansions, the largest and noblest of which was Gladseim; while another, not so spacious, but the fairest of all and brighter than the sun, was called Gimli. See SCANDINAVIAN MYTHOLOGY.

Asgill, äs'gîl, **John**, an eccentric English writer: b. Hanly Castle, 1659; d. 1738. He was bred to the law, and gained considerable reputation, not only by skill in his profession, but from his pamphlet declaring that man might pass into eternal life without dying. In 1703 he took his seat in the Irish Parliament, but was dismissed after four days on account of his so-called blasphemous pamphlet. In 1705 he sat in the English Parliament for Bramber; but in 1707 he was expelled, nominally on account of his unlucky pamphlet, but really perhaps because of

his debts. The remainder of his life he spent in the Fleet and King's Bench prisons, in one of which he died. He wrote a number of pamphlets on the Pretender and on the Hanoverian succession.

Ash (*Fraxinus*), a genus of about 50 species of hardy, ornamental trees of the natural order *Oleaceæ*, natives mainly of North America, Europe, and western Asia. The species are prized for street and park planting for which their usually tall pyramidal or broad-topped habits and light, green foliage, which turns yellow or purple in autumn but which falls early, makes them specially attractive. From the elegance of their forms several species, notably the first mentioned below, have been called the Venus of the forest; the oak being the Hercules. The leaves are rather large opposite, pinnate, and deciduous; the flowers greenish or whitish in panicles, appearing either before, with, or after the leaves; the fruits are rather small samaras. Since grass and other plants do not grow well in the immediate vicinity of the ash it is not a good lawn species. The common ash (*Fraxinus excelsior*), a native of Europe and western Asia, found in its perfection upon loamy soil, often attains a height of 120 or even 150 feet. It also thrives in exposed and elevated situations better than many other trees. Its naked flowers appear long before the leaves, which drop early in the autumn, but during the summer are very ornamental. Its leaflets are sessile and serrated toothed. Its tough, hard, white wood makes excellent fuel and is highly valued for turning (for carriage wheels especially) when the tree has grown rapidly, since the toughness is then very great. It is then particularly valuable for carriage shafts, ladders, handles of agricultural tools, such as rakes, pitchforks, and hoes, where pliability, toughness, and lightness are essential. For such uses its only important rival in America is the hickory. When gnarled, as it occasionally is, it is prepared like "curly" maple for cabinet work and furniture, specially fine-grained specimens being used as veneer. The bark is used to some extent in leather tanning. A large number of cultivated varieties have been produced, among which the most remarkable are: *Monophylla* (erroneously raised by some botanists to the rank of a species), with simple instead of compound leaves or with only one or two small leaflets at the base of the main leaf-blade; *albo-marginata*, the leaflets of which are bordered with white; *albo-variegata*, with mottled white and green leaflets; *aurea*, yellow branched; *aurea-pendula*, drooping yellow branches; *pendula*, one of the best weeping trees; *crispa*, with curled and twisted very dark green leaves. The American or white ash (*F. americana*), a very variable species common from New Brunswick to Florida and westward to Minnesota and Texas, but rare south of New Jersey, attains about the same size as the preceding species, but has lighter bark and leaves. The leaflets have short stalks and are entire. In rich, moist, dense woods the trunks often attain a height of 40 feet without a branch, thus furnishing valuable timber, which is used for the same purposes as that of the preceding species. There are many varieties which more or less resemble those of the common ash. The black or water ash (*F. nigra*), common in swamps and upon stream

ASH (*Fraxinus excelsior*)



1, 2 The unfolding of the bud 3 A shoot in flower 4, 5, 6 Androgynous flower, from different sides 7 The stamen, exposed with two anthers on their filament 8 The pistil 9 The seed-pod, exhibiting the hanging seeds 10 Section of the seed-pod 11 Spray of hanging fruit 12 Fruit laid open, exposing seed 13 The two lobes of the seed, showing inner and outer side 14 Seedling plant

banks from Nova Scotia to Minnesota and southward to Missouri and Virginia, often attains a height of 80 feet. Its wood is softer than that of the preceding, but, being tough and easily separable longitudinally into layers, is largely used for veneer, baskets, barrel staves and hoops. The name *F. sambucifolia*, by which this species is sometimes called, was given it because the bruised leaves smell like those of elder. The red ash (*F. pubescens* or *F. pennsylvanica*) is common in low ground from maritime Canada to Florida, being especially abundant in the swamps of Pennsylvania, Maryland, and Virginia. It is rare west of Ohio, though found as far west as Dakota and Minnesota. It resembles the American ash in uses and in general appearance. The interior of the outer bark of the branches is cinnamon color or red when fresh. The blue ash (*F. quadrangulata*), common in rich, dry, or moist woods from Michigan and Minnesota to Tennessee and Arkansas, and especially abundant in Ohio and Kentucky, attains a height of 80 to 120 feet. Its branches are more or less four-angled, hence the specific name, and the membranes which give the smaller branches this form are specially noticeable on the young shoots. The inner bark yields a blue color when steeped in water, hence the common name. The green ash (*F. viridis*), a species very widely distributed over Canada and the United States from ocean to ocean, is so called from the brilliant green of its young shoots. It is extensively planted to form wind-breaks in Minnesota and the Dakotas on account of its extreme hardness and because it is easily propagated by seeds and also because it grows very rapidly. It is less valued for its wood than the white ash, but is useful for fuel. The Carolina or water ash (*F. caroliniana*), also referred variously to *F. platycarpa* and *F. americana*) seldom exceeds 40 feet in height, but is noted for its very large leaflets. It is distributed from Virginia to Florida and westward to Arkansas and Texas, being most plentiful in swamps, along water courses and in damp, rich woods. Its wood is used like that of the white ash. *F. cuspidata*, a native of the southwestern United States and northern Mexico, is a shrub or small tree which seldom exceeds 20 feet in height, and on account of its conspicuous panicles of fragrant flowers is often planted in temperate climates for ornamental purposes. *F. velutina*, also sometimes referred to *F. pistaciaefolia*, another species of the same region, seldom attains a height of 50 feet, and not being hardy is confined to southern planting. The manna or flowering ash (*F. Ornus* or *Ornus europæa*), a native of southern Europe and western Asia, is a small tree 25 feet tall which resembles the common ash. It furnishes manna (q.v.), as does also *F. rotundifolia*, which by some botanists is considered a variety of *F. Ornus*. It is a native of Greece. Many other species are of botanical, economic, or ornamental interest, but probably none of as much importance as the species mentioned. The mountain ash (q.v.), a member of the natural order *Rosaceæ*, obtains its name from its ash-like leaves.

Consult: Nicholson, 'Dictionary of Gardening' (1888); Bailey and Miller, 'Cyclopædia of American Horticulture' (1900-2).

Ash, or Ash'es, the fixed residue obtained by burning any part of an organized substance in air. Ash usually contains the following, or some of the following, metallic and non-metallic elements:

Metals	Non-metals
Potassium	Chlorine
Sodium	Bromine
Calcium	Iodine
Barium	Phosphorus
Iron	Sulphur
Manganese	Silicon
Aluminum	Carbon
Copper	
Zinc	

These substances are combined in various forms in the living body of the plant or animal. They are derived from the soil in the case of plants, and chiefly from plants in the case of animals. Different parts of the animal or vegetable frame are characterized by differences in the ash which they leave when burned; thus ash of bones consists largely of phosphate of calcium; the animal fluids and the juices of plants contain chlorid of sodium; sea-plants leave an ash rich in alkaline carbonates and also characterized by the presence of bromids and iodids of the alkalis. (See BARILLA; KELP.) Many grasses contain large quantities of silica, which appears in the ash of these plants. An examination of the ash of plants often leads to important conclusions as to the most suitable manure to employ for enriching the soil in which the plants are to be grown.

Ashes.—The non-volatile, inorganic portion of an animal or vegetable substance left behind after incineration. Ashes consist of the most part of carbonates, sulphates, sulphids, silicates and phosphates of potassium, sodium, calcium, magnesium, manganese, and iron, with occasional admixture of unusual elements such as aluminum. In certain seaweeds iodine is a prominent constituent of the ash, and silica occurs in many rushes. The solid matters taken up by plants are not absorbed in anything like the proportions in which they occur in the soil whence they are derived. This is well illustrated by analyses of the ashes of different plants, growing side by side in the same soil. Thus Kerner gives four such analyses, made on the ashes of (1) the water-soldier (*Stratiotes aloides*); (2) the white water-lily (*Nymphæa alba*); (3) a stonewort (*Chara fætida*), and (4) a reed (*Phragmites communis*). The results, so far as potash, soda, lime, and silica are concerned, are as follows:

PERCENTAGE COMPOSITION OF ASH.

	Water soldier	Water lily	Stonewort	Reed
Potash	30.8	14.4	0.2	8.6
Soda	2.7	29.7	0.1	0.4
Lime	10.7	18.9	54.8	5.9
Silicic Acid	1.8	0.5	0.3	71.5

These four plants grew close together and the soil from which they drew their supplies was identical, so far as could be discovered. The stonewort, it will be seen, contained a very large quantity of lime, and barely a trace of potash, soda, or silica; while nearly three quarters of the ash of the reed consisted of silica, and there

ASH-FLY — ASHANTEE

was less than one ninth as much lime as was found in the stonewort. If we pass from the consideration of different plants growing in the same soil to that of the same plant growing in different soils, the results are equally surprising. Thus Kerner gives analyses of the ash obtained from the foliage and branches of the yew tree (*Taxus baccata*), the specimens analyzed being taken from soils rich in serpentine, limestone, and gneiss, respectively. The results are presented in the accompanying table. It will be seen that there are some slight differences in composition, but when the wide difference in the soils is taken into account it is remarkable that the proportions are so nearly alike.

Substance Found	Nature of Soil		
	Serpentine	Limestone	Gneiss
Silicic Acid	3.9	3.6	3.7
Sulphuric Acid	1.9	1.6	1.9
Phosphoric Acid	8.3	5.5	4.2
Iron Oxid	2.1	1.7	0.6
Lime and Magnesia	38.8	41.2	36.3
Potash	28.6	21.8	27.6
Carbonic Acid	14.1	23.1	24.4

One feature that was prominent in the analyses of the yew-tree ash has been purposely obscured in the table by counting the lime and magnesia together. It appears that when a plant needs a certain substance for its growth it will sometimes make use of another substance whose chemical properties are closely similar, provided the more desirable one cannot be had in sufficient quantities. Thus the ash of the yew-trees growing over limestone contained 36.1 per cent of lime and 5.1 per cent of magnesia; and that of the trees growing over gneiss contained 30.6 per cent of lime and 5.7 per cent of magnesia. The serpentine soil, however, was much poorer in lime than either of the others,—serpentine being composed almost entirely of magnesium, silicon, and oxygen,—and the trees growing upon this soil, being unable to obtain the necessary quantity of lime, accepted, in the place of the lime, an equal weight of magnesia, which strongly resembles lime in its chemical properties; the observed quantity of lime in these trees being only 16.1 per cent, while magnesia was present to the extent of 22.7 per cent. The ashes of plants show that in certain cases the plants from which they are obtained possess a wonderful power of collecting large amounts of some particular substance, even when this substance is present in the soil or water in which they are growing in such minute quantities that it can barely be detected by the most delicate chemical tests. For example, the sea-weeds of the North Sea are so rich in iodine that their ashes formed the chief supply of this substance for years,—in fact, until the extensive South American deposits of sodium iodide were discovered. It would naturally be inferred that the North Sea contains considerable quantities of soluble iodides; but the fact is, that no trace of iodine or of iodides has yet been detected in it, by the most delicate tests. Wood ashes have long been used as a source of potash, this substance being readily obtained from them by mere leaching with water. The greater part of the

potash of commerce is now obtained from other sources, but the leaching process is still in use in country places where wood ashes are plentiful, the potash so obtained being chiefly used for the manufacture of soap. Wood ashes are also valuable for fertilizing purposes, on account of the potash and phosphorus they contain.

Ash-fly, the gall-fly of the oak (*Cynips quercifolia*). See GALL; GALL-FLY.

Ash-leaved Ma'ple. See BOX ELDER.

Ash-Wednesday, the first day of Lent. The name is derived from the ancient custom of putting ashes upon the head as a symbol of humble repentance for sin. In the Roman Catholic Church it is part of the religious service on this day for the priest to put ashes on the forehead of each worshipper while kneeling at the altar rails. In the English Church and in the American Episcopal Church the day is observed with especial solemnity as the opening of the penitential season, and also in the Unitarian "King's Chapel," in Boston, Mass.

Ashantee, a-shān'tē, a negro kingdom of western Africa and practically a part of the British colony of the Gold Coast. Its boundaries cannot be stated with any definiteness, but its area may be roughly estimated at 10,000 square miles. It is in general hilly and is largely covered with forests. It is well watered and extremely fertile, but the climate is unhealthy. Among the trees are the baobab, palms, and cotton trees. The crops are chiefly rice, corn, sugar-cane, and yams, the last forming the staple vegetable food of the natives. The domestic animals are cattle, horses of small size, goats, and a species of hairy sheep. The larger wild animals are the elephant, rhinoceros, buffalo, lion, hippopotamus, etc. Birds are numerous and crocodiles and other reptiles abound. Gold is obtained, being found either in the form of dust or in nuggets. The Ashantees long made themselves well known as being warlike and ferocious, with a love of shedding human blood amounting to a passion. Human teeth and jaw-bones were worn as personal ornaments, and human sacrifices used to be frequent. On the death of a king or chief enormous numbers of victims were slaughtered with circumstances of revolting cruelty, and there were regularly recurring periods, at intervals of 18 or 24 days, called the great and little *adaï*, when human sacrifices were made. Notwithstanding this there exist among the Ashantees certain of the arts of civilization. They excel in the manufacture of cotton cloths and in the fabrication of articles in gold; they make good earthenware, tan leather, and make sword-blades of superior workmanship. The native government is a monarchy. The chief town is Coomassie or Kumasi. The British first came in contact with the Ashantees in 1807, when a treaty was concluded by the governor of Cape Coast with the king of Ashantee, acknowledging the sovereignty of the latter by right of conquest over the coast, including Cape Coast Castle. In 1823 war was proclaimed by the Ashantees against the British, and they succeeded in the following year in defeating a small body of troops led by the governor, who perished with almost all his officers; but in 1826 the Ashantees were completely defeated near Accra. At the close of another war, in 1831, the river Prah was fixed as the bound-

ASHBURNER — ASHEVILLE

ary between the Ashantee kingdom and the states protected by Great Britain, but the Ashantees soon began to interfere beyond the boundary. Early in 1873 the Ashantees again invaded the territory protected by Great Britain, and Gen. Wolseley (subsequently Viscount Wolseley) was now sent against them. The Ashantee general Amanquanta had concentrated his troops, 20,000 strong, at Amoaful, 20 miles from Coomassie. The British general led to the attack 1,481 English and 708 native troops, whom he formed into a square. The battle began on 31 January, on which day Amoaful was taken. The British continued to advance fighting, the enemy at the same time attempting to break in upon their rear by attacking the troops left at Fommanah. On the 4th Coomassie was entered. The loss of the British in killed and wounded was 300, and a large number ultimately succumbed to the climate. As the king refused to enter Coomassie to sign a treaty, the British set fire to the town and began their return march on the 6th. The treaty signed soon after stipulated that the king of Ashantee should renounce his claims to the protectorate over the allies of Great Britain; that free trade and open communication should be established with the coast, and that the king should pay an indemnity of 50,000 ounces of gold. The last condition was not faithfully observed, but the result of the war was greatly to weaken the power of the Ashantees. The conduct of King Prempeh, a successor of King Koffee, led to the dispatch of another British expedition, which in 1896 entered Coomassie without resistance, and received the abject submission of the king, who was taken and sent into banishment. A British resident has since been stationed in the country, which is now a British protectorate, subordinate to the governor of the Gold Coast, and will no longer be the scene of human sacrifices and slave trading. In June 1898 an agreement was arrived at between Great Britain and France with regard to the boundaries between their respective territories here. The population of Ashantee is estimated at from 1,000,000 to 3,000,000.

Ash'burner, Charles Albert, an American geologist: b. Philadelphia, 9 Feb. 1854; d. Pittsburgh, 24 Dec. 1889. He graduated at the head of his class at the University of Pennsylvania, and was appointed assistant State geologist in 1875. He originated a method of surveying and representing the geology of the anthracite coal fields which received the approbation of mining engineers throughout the world. He was also an accepted authority on the natural-gas fields. In 1886 he entered private practice as an expert and became closely associated with the Westinghouse interests. He prepared over 20 of the Pennsylvania State geological survey reports, and contributed to scientific and technical journals.

Ash'burnham, Sir Cromer, an English military officer: b. 1831. He served with distinction in the Indian Mutiny campaign, Afghanistan campaign, the Boer war (1881), the Egyptian, and eastern Sudan campaigns; and was subsequently governor of Suakim.

Ash'burton, Alexander Baring, Lord, an English statesman and financier: b. London, 27 Oct. 1774; d. 13 May 1848. He was the second son of Sir Francis Baring, and the affairs of

the famous mercantile house established by his father kept him employed in Canada and the United States for many years. In 1810 he became the head of the house of Baring Brothers, and in 1812 sat in Parliament for Taunton. He was created Baron Ashburton in 1835. He was appointed special ambassador to the United States in 1842 to settle the Northwestern boundary question and other matters in dispute between England and America. A street in Boston, known as Ashburton Place, was named in his honor.

Ash'burton River, a stream in western Australia flowing 400 miles and emptying into the Indian Ocean, lat. 22° S.; lon. 115° W.

Ash'burton Trea'ty, a treaty concluded at Washington in August 1842 by Alexander Baring, Lord Ashburton, and the President of the United States. It defined the boundaries between the United States and Canada.

Ash'by, Turner, an American soldier: b. 1824; d. June 1862. He entered the Confederate army in 1861 and became a brigadier-general. He was especially distinguished for his gallantry. He was killed in a skirmish at Harrisburg, Va.

Ashby-Sterry, Joseph, a well known English writer on the staff of the *Daily Graphic*. He is novelist and poet, as well as journalist, and among his published books are: 'Nutshell Novels' (1890); 'The Lazy Minstrel,' a collection of brilliant verse (1892); 'Naughty Girl, a Story of 1893' (1893); 'A Tale of the Thames in Verse' (1896); 'The Bystander, or Leaves for the Lazy' (1900).

Ashby-de-la-Zouche, äsh'bī-dē-la-zooch', a market town in Leicestershire, England, on the borders of Derbyshire, 17 miles northwest of Leicester. It has wide, well-paved streets, and its parish church of Saint Helen is a handsome building with stained-glass windows, carvings, and monuments. The Ivanhoe baths attract visitors, the waters being beneficial for some ailments. The ruins of Ashby Castle, well known to readers of 'Ivanhoe,' which received Mary Queen of Scots as a prisoner, are still visible. Pop. (1901) 4,700.

Ash'dod. See ASDOD.

Ashe, äsh, John, an American soldier: b. in North Carolina, 1720; d. 24 Oct. 1781. He was a member of the first Provincial Congress and served in the American Revolution as a brigadier-general of North Carolina troops. Asheville, N. C., was called in his honor.

Ash'er, the name of the eighth son of Jacob. He founded the tribe called after him, which occupied a fertile territory in Palestine along the coast between Carmel and Lebanon.

Asheville, äsh'vīl, N. C., a city and county-seat of Buncombe County, on the Southern R.R., near the French Broad River; 275 miles west of Raleigh. It is in a tobacco-growing region; has manufactories of cotton goods, shoes, ice, tobacco, and flour; and is widely famed as a winter and summer resort. The city is 2,350 feet above the level of the sea and is surrounded by impressive mountain scenery. It has the Asheville College for Young Women, Bingham Military School, Asheville School for Boys, Normal College and Collegiate Institute for Young

ASHEVILLE COLLEGE — ASHLEY

Women, Home Industrial School for Girls, Asheville Farm School for Boys, Industrial School for Colored Youth, an auditorium centrally situated seating 2,000, and free to conventions, weather bureau, three national banks, and nearly 50 hotels and boarding-houses. It has modern sewerage, electric light and gas plants, a water supply by 17 miles of pipe line from trout streams on the water shed of Mt. Mitchell, and an electric street car system with a trolley road to Sunset Mountains. In the suburbs are the grand estate of Biltmore, established by George Vanderbilt of New York city; one of the finest botanical gardens in the world; Pisgah forest, a hunting preserve of 84,000 acres; Riverside Parks; and Mount Beaumont, 2,800 feet high. Pop. (1900) 14,694.

Asheville College, a non-sectarian educational institution for women, in Asheville, N. C. It was organized in 1842, and at the end of 1899 had 17 professors, 135 students, and grounds and buildings valued at \$100,000.

Ashford, a market-town in Kent, England, pleasantly situated on the river Stour. There are corn and cattle markets, and the Southeastern Railway Company have their principal locomotive and carriage establishments here. Pop. (1901) 12,808.

Ashhurst, John, an American surgeon: b. 1839; d. 1900. He was graduated at the University of Pennsylvania in 1857; served as an army surgeon in the Civil War; became surgeon of several Philadelphia hospitals after his return; and was made president of the College of Physicians in Philadelphia in 1898. He held surgical chairs in the University of Pennsylvania; was a member of the principal medical and surgical associations of the country; and besides many individual publications edited the 'International Encyclopædia of Surgery' (1881-1886); and 'Lippincott's New Medical Dictionary.' He was the author of 'Injuries of the Spine' (1867); and 'Principles and Practice of Surgery' (1871).

Ashikaga, a'she-kā'ga, a town in Japan, 17 miles by rail from Tokyo. From the 9th to the 17th century it was of much importance as a seat of learning. It is now noted for its trade in silk and cotton. Pop. (1898) 21,348.

Ashkelon. See ASCALON.

Ashland, Ky., a city of Boyd County, situated on the Ohio River; on the Chesapeake & Ohio, Norfolk & Western, and other railroads. It was chartered as a city in 1870. Its manufactures include cut and wire nails, steel billets, sheet steel, leather furniture, etc., and it is a shipping point for iron ore and coal. Pop. (1900) 6,800.

Ashland, Ky., an estate in the suburbs of Lexington, famous as the home of Henry Clay. It consists of about 600 acres, 200 of which form a park similar to the large private parks of England. The house in which Mr. Clay lived was a plain structure, two stories in height. After his death the property passed by public sale into the hands of his eldest son, James B. Clay, who took down the old house and rebuilt it.

Ashland, Ohio, a town and county-seat of Ashland County; on the Erie R.R., 65 miles southwest of Cleveland. It has important manufactures, large trade, a national bank, and sev-

eral newspapers, and is the seat of Ashland University, a non-sectarian institution, founded in 1878. Pop. (1900) 4,087.

Ashland, Ore., city and county-seat of Jackson County; situated in the extreme southern part of the State, on the Southern Pacific Railroad, 341 miles south from Portland, and 431 miles northerly from San Francisco. Ashland is the seat of the Southern Oregon State Normal School, and has three public school buildings and eight church buildings. The city has an excellent municipal organization and police regulation. Ashland owns its own water system. There is an extensive electric-light and power plant, flour-mill, ice plant, sash and door factories, box factory, quartz-mill, foundry and machine shops, and three newspapers. The Southern Oregon Chautauqua Association is located here. There are valuable gold mines in the mountains near by, some of them almost within the city limits. In the vicinity are found great varieties of other valuable minerals, such as cinnabar, kaolin, marble, sandstone, etc. In the vicinity are many mineral springs, whose waters contain much in the way of medicinal properties. Pop. (1902) 4,000.

Ashland, Pa., a borough in Schuylkill County, in the valley of the Mahanoy, and on several railroads; 12 miles northwest of Pottsville. It is in the centre of the great anthracite coal field, has extensive mining industries, large machine shops, foundries, and factories, and contains the State Miners' Hospital, a national bank, public hall, and several churches. Pop. (1900) 6,538.

Ashland, Va., a town of Hanover County, situated on the Richmond, F & P. R.R., 17 miles north of Richmond. It is the seat of Randolph-Macon College. It was the scene of several battles during the Civil War. Henry Clay's birthplace is within seven miles of the town. Pop. (1900) 1,147.

Ashland, Wis., a city and county-seat of Ashland County, on Chequamegon Bay, Lake Superior, and several railroads; 80 miles east of Duluth. It has one of the finest harbors on the lake, and beside its general lake traffic is a shipping port for the hematite ore of the great Gogebic Iron Range. To accommodate its iron interests it has a number of enormous ore docks. Other important interests are lumber and brown stone. It has very large charcoal blast furnaces, used for the manufacture of pig iron, and since 1885, when the real development of the Gogebic iron mines began, the city has grown rapidly. Near by is the group of Apostles' Islands. The institutions include the North Wisconsin Academy, Sisters' Hospital (Roman Catholic), and Rhinehart Hospital. Pop. (1900) 13,074.

Ashlar. See MASONRY AND BUILDING.

Ashley, Anthony Evelyn Melbourne, an English statesman: b. 1836. He is the fourth son of the seventh Earl of Shaftesbury, and in 1882 succeeded Mr. Courtney as under-secretary of state for the colonies.

Ashley, Lord. See SHAFTESBURY.

Ashley, William James, an Anglo-American economist: b. London, England, 25 Feb. 1860. He was graduated from Balliol College, Oxford, in 1881; was Fellow of Lincoln College, Oxford; lecturer in history in Lincoln and Cor-

ASHMEAD-BARTLETT — ASHTAVAKRA

pus Christi, 1885-8, and professor of political economy and constitutional history at the University of Toronto, Canada, 1888-92. He has been professor of economic history at Harvard University since 1892. He has written 'James and Philip van Artevelde' (1883); 'Introduction to English Economic History and Theory' (1888-93); 'Surveys, Historic and Economic' (1900); edited 'Economic Classics'; translated Schmoller's 'Mercantile System,' and has contributed a large number of articles to English and American economic journals.

Ash'mead-Bartlett, **SIR ELLIS**, an English politician: b. Brooklyn, N. Y., 1849; d. London, England, 19 Jan. 1902. He was educated at Christ Church College, Oxford, and admitted to the bar in 1877. He was examiner of the education department, 1874-80; Conservative member of Parliament from Suffolk, 1885, and from Sheffield, 1885-1902; civil lord of the admiralty, 1885, 1886; and was knighted in 1892. His popularity with political audiences in the early 80's was second only to that of Lord Randolph Churchill, but he lost much of this influence in later years owing to his association with the Turks and Swazis—a connection which subjected him to considerable ridicule in the House of Commons and the press. His chief literary production was 'The Battlefields of Thessaly' (1897), a record of his experiences in the last war between Greece and Turkey.

Ash'mole, **ELIAS**, a celebrated English antiquary: b. Lichfield, 1617; d. 1692. He practised as a chancery solicitor till the breaking out of the Civil War, when he retired to Oxford and entered himself of Brasenose College, and engaged in the study of natural philosophy, mathematics, and astronomy. At the Restoration he received the post of Windsor herald and other appointments, both honorable and lucrative. In 1672 appeared his 'History of the Order of the Garter.' Other works of his are: 'The Antiquities of Berkshire' (1719) and his 'Diary' (1717). He presented to the University of Oxford his collection of rarities, to which he afterward added his books and MSS., thereby commencing the Ashmolean Museum.

Ashmolean Museum, a museum at Oxford University, founded by Elias Ashmole (q.v.) in 1679. The building was erected by Sir Christopher Wren in 1682.

Ash'mun, **GEORGE**, an American lawyer: b. Blanford, Mass., 1804; d. 1870. He served for several years in the legislature of his native State and was prominent in Congress in 1845-50. He presided over the Chicago Convention which in 1860 nominated Lincoln for the presidency.

Ashmun, **JEHUDI**, an American missionary: b. Champlain, N. Y., April 1794; d. Boston, Mass., 25 Aug. 1828. He prepared for the Congregational ministry, and became professor in Bangor Theological Seminary. Later he joined the Protestant Episcopal Church and edited one of its periodicals, 'The Theological Repertory.' He discovered his true vocation when he became an agent of the American Colonization Society and took charge of a reinforcement for the colony of Liberia in 1822. He found the colony utterly disorganized, but in six years his energy and ability had thoroughly reorganized it and he left it in a prosperous and orderly condition. He

died soon after his return to the United States. He wrote 'Memoirs of Samuel Bacon' (1822), and his own life was written by R. R. Gurley (1839).

Ashochimi, ash-ō-chē-mē, or *Wappo*. A tribe of North American Indians who formerly ranged in California from the geysers to Calistoga hot springs and in Knight's Valley.

Ashraf, a-schráf', a town in Persia, near the southern coast of the Caspian Sea, 56 miles west of Astrabad. It was a favorite residence of Shah Abbas the Great, and was adorned by him with splendid buildings, of which only a few miserable ruins now remain.

Ashtabu'la, Ohio, city in Ashtabula County, on Lake Erie, at the mouth of the Ashtabula River; 54 miles east of Cleveland; on the New York, C. & St. L., the Pittsburg, Y. & A., and the Lake Shore & M. S. R.R.'s. It is the centre of an extensive agricultural and dairying region, and has large manufactories of leather, woolen goods, and farm implements. It has a Carnegie public library, three national banks, city hospital, and numerous large buildings. Its extensive railroad and lake commerce makes it an important transfer shipping point, especially for iron and coal. The city was first settled in 1801, was organized as a township in 1805, and incorporated as a city in 1892. On 29 Dec. 1876, a railroad accident here at a high bridge over the river resulted in the loss of over 100 lives. The city is governed by a mayor and city council elected biennially. Pop. (1890) 8,338; (1900) 12,949.

Ash'taroth, a goddess anciently worshipped by the Jews. Ashtaroth is the Astarté of the Greeks and Romans, and is identified by ancient writers with the goddess Venus (Aphrodite). She is probably the same as the Isis of the Egyptians. In Scripture she is almost always joined with Baal, and is called god, Scripture having no particular word for expressing goddess. She was the goddess of the moon; her temples generally accompanied those of the sun, and while bloody sacrifices or human victims were offered to Baal, bread, liquors, and perfumes were presented to Astarté.

Ashtavakra, ash-ta-va'kra. In Hindu legend, the hero of a story in the Mahabharata. His father, Kahoda, devoted to study, neglected his wife. Ashtavakra, though still unborn, rebuked him, and the angry father condemned the son to be crooked (hence the name, from *Ash-tan*, eight, and *vakra*, crooked). At the court of Janaka, king of Mithila, Kahoda was defeated in argument by a Buddhist sage and was drowned in accordance with the conditions. In his 12th year Ashtavakra set out to avenge his father, and worsted the sage, who declared himself to be a son of Varuna sent to obtain Brahmins to officiate at a sacrifice. Kahoda was restored to life, and commanded his son to bathe in the Samanga River, whence the boy becomes perfectly straight. In the Vishnu Purana some celestial nymphs see Ashtavakra performing penance in the water and worship him. He promises them a boon and they ask the best of husbands. When he offers himself they laugh in derision at his crookedness. He cannot recall his blessing, but condemns them to fall into the hands of thieves.

ASHTON — ASIA

Ash'ton, John, an English antiquarian: b. London, 22 Sept. 1834. He has published a long list of works on history, chap-books, legends, ballads, manners, and customs, caricature and satire, among which are 'Social Life in the Reign of Queen Anne' (1882); 'History of the Chap-books of the 18th Century' (1882); 'Social England under the Regency' (1890); 'When William IV. was King' (1896); 'Gambling in England' (1898); 'Florizel's Folly' (1899).

Ashton, Lucy, the heroine of Sir Walter Scott's novel, 'The Bride of Lammermoor.' Engaged to a man she loves, she is forced to marry another, and dies a maniac on her wedding day.

Ashton'-in-Mak'erfield, a town of Lancashire, England, 15 miles from Manchester, and noted for its potteries, collieries, and cotton-mills. Pop. (1901) 18,700.

Ash'ton-Un'der-Lyne, a market-town of Lancashire, England, 6 miles east of Manchester, on the north bank of the river Tame. It was an ancient Saxon town; the most interesting building is the parish church built in the reign of Henry V. Since 1769 it has grown rapidly through the extension of the cotton manufacture, both the spinning of cotton yarn and the weaving of calicoes being carried on in the town to a great extent. Upward of 20,000 work people are employed in factories. There are also collieries and iron-works in the neighborhood which employ a great many persons. Pop. (1901) 43,900.

Ashura'da, a small island in the south-east corner of the Caspian Sea. It is occupied by Russia as a naval and trading station.

Asia, the largest of the five continental divisions of the earth, lying eastward of the European and African continents, and separated from the American continent by Bering Strait and the Pacific Ocean. It is bounded north, east, and south, respectively, by the Arctic, Pacific, and Indian Oceans, with their various branches and inlets; it is divided from Africa on the southwest by the narrow isthmian Suez Canal; and is connected with Europe on the northwest across the whole breadth of that continent. The natural western boundaries are the Ural Mountains, the Caspian Sea, Caucasus Mountains, the Black Sea, Ægean Sea, the Mediterranean and Red Seas. The sinuosities of the Asiatic coast are very extensive; on the south the chief ocean inlets are the Gulf of Aden; the Arabian Sea with its inlets, the Gulf of Oman, the Persian Gulf, and the Gulfs of Cutch, Cambay, and Manar; and the Bay of Bengal containing the Gulf of Martaban. On the eastern or Pacific coast proceeding northward the principal indentations are the China Sea with the Gulfs of Siam and of Tonkin; the Tung-hai or Eastern Sea; the Hwang-hai or Yellow Sea with the Gulf of Pechili and Korea Bay; the Sea of Japan with the Gulf of Tartary; the Sea of Okhotsk; and Bering Sea with the Gulf of Anadyr. On the north or Arctic coast are the Nordenskjöld Sea and the Kara Sea with the Gulf of Obi. The coast line is about 35,000 miles, giving a proportion of one mile of coast line to 496 square miles of surface. From the extreme southwestern point of Arabia, at the Strait of Bab-el-Mandeb

to the extreme northeastern point of Cape Deshnef or East Cape, the length of Asia is about 6,900 miles, its breadth from Cape Chelyuskin or Northeast Cape in Siberia to Cape Romania, the southern extremity of the Malay Peninsula, is about 5,300 miles. The total area is estimated at 17,296,000 square miles. The most prominent features of the southern coast are the three great peninsulas of Arabia, India, and the Indo-Chinese Peninsula. The east coast is also flanked with insular and peninsular projections, forming a series of sheltered seas and bays. A series of large islands extends to the southeast of the continent, forming a connection with Australia; while a multitude of smaller islands are scattered over the Pacific and Indian Oceans. The principal peninsulas on the east are Kamchatka and Korea. The larger islands, proceeding from the northeast coast, are Saghalien, the Japanese Islands, the Philippine Islands, Borneo, Sumatra, Java, Celebes, the Moluccas, Papua or New Guinea, which, however, is Australasian rather than Asiatic, and lastly Ceylon at the southeastern extremity of the Indian Peninsula. The Kurile Islands, between Kamchatka and Japan, the islands of Loo Choo, Formosa, and Hainan on the Chinese coast, and the Andaman and Nicobar islands in the Indian Ocean, may also be noticed. On the west or Mediterranean coast the principal islands belonging to Asia are Cyprus and Rhodes. The northern coast, from East Cape or Deshnef, in Bering Strait, and on the Arctic Circle, to the Yalmal Peninsula, in the extreme northwest, is almost entirely contained within that circle. The highest point, Cape Chelyuskin, is about 78° N. The largest group of islands on the north coast is the Liakhov Islands (New Siberia); the largest indentation is the Gulf of Obi, which reaches below the Arctic Circle, and receives the river Obi about that latitude.

Mountains.—The mountain systems of Asia are of great extent, and their culminating points are the highest in the world. There are also vast plateaus and elevated valley regions, but large portions of the continent are low and flat. Such are the greater portions of Siberia, from the Ural Mountains across the north of the continent, and the western central region of the continent, where an area of great depression culminates in the Caspian. The greatest mountain system in Asia, and so far at least as altitude is concerned, of the world, is the Himalayan system, the principal mass of which lies between lon. 65° and 110° E. and lat. 28° and 37° N. It thus occupies a position not very far from the centre of the continent, though nearer the southern edge than the northern. It extends, roughly speaking, from northwest to southeast, its total length being about 2,000 miles, while its breadth varies from 100 to 500 or 600. Different names have been given to different portions of the system, such as Hindu Kush (the northwestern extremity), Karakoram, and Kuen-Lun, while Himalaya is more especially confined to the portion forming the northern barrier of Hindustan; but all these are really portions of the same connected mountain mass. The Kuen-Lun simply forms the northern flank of the mass, and is not, as it has been represented, a distinct chain; while the Karakoram Mountains have so little to distinguish them from the rest of the elevated mass

ASIA

SCALE OF MILES

0 100 200 400 600 800

Population of places is indicated by different lettering, thus:

200,000 and over **HONGKONG**
 100,000 to 200,000 **Agra**
 50,000 to 100,000 **Jerusalem**
 10,000 to 50,000 **Katmandu**
 Smaller Places **Kou Kou Kota**

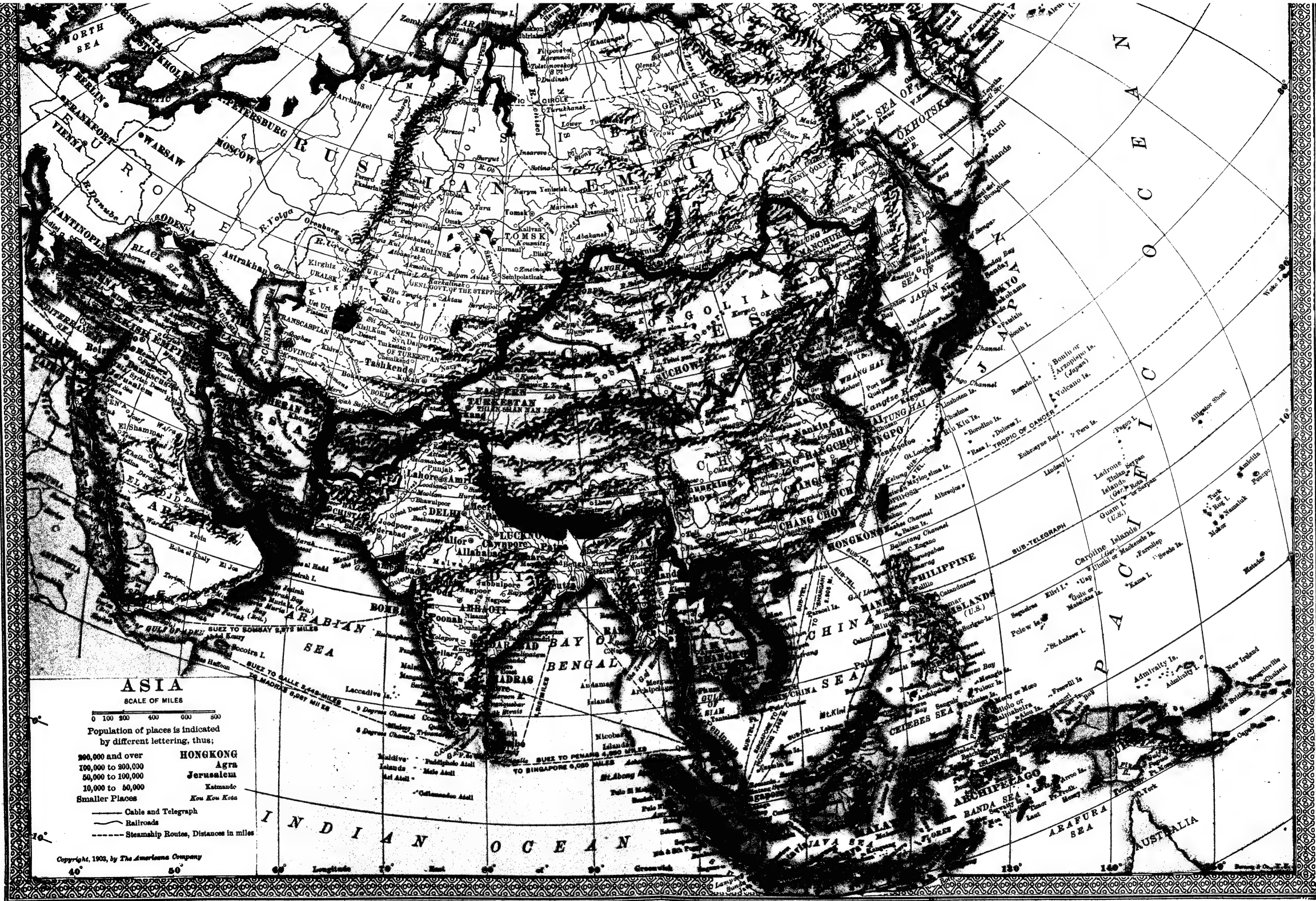
— Cable and Telegraph

— Railroads

--- Steamship Routes, Distances in miles

Copyright, 1903, by The Americana Company

40° 50° 60° Longitude



ASIA

to which they belong that they may be crossed without the traveler being aware of it. The broadest part of the system, the elevated table-land of Tibet, lies between the Himalaya proper and the Kuen-Lun. The Tibetan Mountains are connected on the east with the mountains of China and with those that spread to the southeast over the Indo-Chinese Peninsula. The Thian-Shan is another great mountain system of Central Asia connected with the Himalayan system by the important Pamir Plateau or "roof of the world" in lon. 70° - 80° east; lat. 37° - 40° north. The point of junction forms "a huge boss or knot," from which the Thian-Shan runs northwestward for a distance of some 1,200 miles. Between these two systems, which curve round it on the west, lies eastern Turkestan, right in the centre of Asia. The greatest elevations of the Himalayan system are to be found among the Himalayas proper, where is Mount Everest, 29,002 feet high, Kunchinjunga, 28,156, etc. The principal passes here, which rise to the height of 18,000 to 20,000 feet, are the highest in the world. The Kuen-Lun summits reach a height of 22,000 feet. The Himalayas descend by successive slopes to the plain of northern India, which has an elevation of about 1,000 feet above the level of the sea. The Vindhya cross the peninsula, dividing northern from southern India; the latter is further bounded by the eastern and the western Ghats, which run along the coasts; while the interior consists of elevated tablelands rising toward the south, where they attain in the neighborhood of the Nilgiri Hills an elevation of 7,000 feet. The Himalayas are not only connected with the mountains in the interior of India, and with ramifications into China and the Indo-Chinese peninsula, but on the west with the mountains of Baluchistan and Afghanistan. The Suliman and Hala ranges bound India on the west, and unite with the mountains of Baluchistan; while the Hindu Kush, passing westward through the north of Afghanistan, has continuations more or less distinct through Persia to the Elburz range south of the Caspian, and so onward to Mount Ararat. From this point again it forms connections with the mountains of Armenia, with the Caucasus, with the Taurus range in Asia Minor, and with the mountains which run to the south of Persia. The mountains belonging to this series form the boundaries of an elevated plateau extending from the Mediterranean to the Indus. On the north they are frequently of great elevation, Mount Demavend in the Elburz range reaching the height of 18,460 feet, while Ararat is nearly 17,000. The Thian-Shan system is continued to the northeast by the Altai and Sajansk ranges, the whole separating the Chinese Empire from Russian Turkestan and Siberia. Tengri-Khan in the Thian-Shan Mountains is estimated to have a height of 21,320 feet. A line of moderate elevation extends from the Altai westward to the Ural Mountains. To the east of the Sajansk range the Yablonoi Mountains run northeast toward the coast, along which they are continued northward under the name of Stanovoi to Bering Strait.

Table-lands, Plains, and Deserts.—Tibet forms the most elevated table-land in Asia, its mean height being estimated at 15,000 feet. Its surface is very rugged, being intersected by a

number of mountain ranges running generally in an easterly and westerly direction. On the east it is bounded by lofty mountains which separate it from China. Some of the largest rivers of southern and southeastern Asia have their origin in Tibet, including the Indus, the Brahmaputra, the Yang-tse, and the Hoang-Ho. In this region, a numerous series of lakes run in a chain parallel to the Himalayas. Another great plateau, much lower, however, than that of Tibet, is the plateau of Iran, occupying a large portion of western Asia, extending from the Indus to the Mediterranean, and from the Persian Gulf to the Caspian Sea. It comprises the countries known as Afghanistan, Baluchistan, Persia, Armenia, and Asia Minor. It lies at altitudes varying from 2,000 to 8,000 feet above the sea. The eastern half of it consists to a large extent of unproductive wastes. Of great political and strategical importance at the junction of Turkestan, Afghanistan, and India, is the Pamir Plateau, already alluded to, called by the natives "the roof of the world." Its valleys are at an elevation of from 11,000 to 13,000 feet above the sea. Another table-land of smaller extent and elevation is the Deccan Plateau, India, south of the parallel of lat. 25° N. The principal plain of Asia, as already mentioned, is that of Siberia, which extends along the north of the continent and forms a vast alluvial tract sloping to the Arctic Ocean, and traversed by large rivers, such as the Obi, the Yenisei, and the Lena, that convey its drainage to that ocean. Vast swamps of peat-mosses called tundras cover large portions of this region. Southwest of Siberia, and stretching eastward from the Caspian to the Thian-Shan Mountains, is a low-lying tract, consisting to a great extent of steppes and deserts, and including in its area the Sea of Aral, Bokhara, Khiva, and other districts. This is a region of internal drainage, the rivers, among which are the Amu Daria and the Syr Daria, either falling into the Sea of Aral or into other smaller sheets of water. In the east of China there is an alluvial plain of some 200,000 square miles in extent, most of it productive and highly cultivated; in Hindustan there are plains extending for 2,000 miles along the south slope of the Himalayas; and between Arabia and Persia, watered by the Tigris and Euphrates, is the plain of Mesopotamia or Assyria, one of the richest in the world. Of the deserts of Asia the largest is that of Gobi, which is bounded on the north by the Yablonoi and Thian-Shan Mountains, on the south by Tibet, on the east by the Khingan Mountains on the borders of China; while in the west it extends into eastern Turkestan. Large portions of it are covered with nothing but sand or display a surface of bare rock. This desert forms a large part of the country known as Mongolia, the whole of which forms an area of internal drainage, deficient in rainfall. There are also extensive desert tracts in Persia, Arabia, and Hindustan. An almost continuous desert region may be traced from the African desert through Arabia, Persia, and Baluchistan to the Indus.

Rivers and Lakes.—Asia contains some of the largest rivers in the world. It is remarkable among the continents for the number of its rivers, some of them of large size, that never find their way to the ocean, their waters either

ASIA

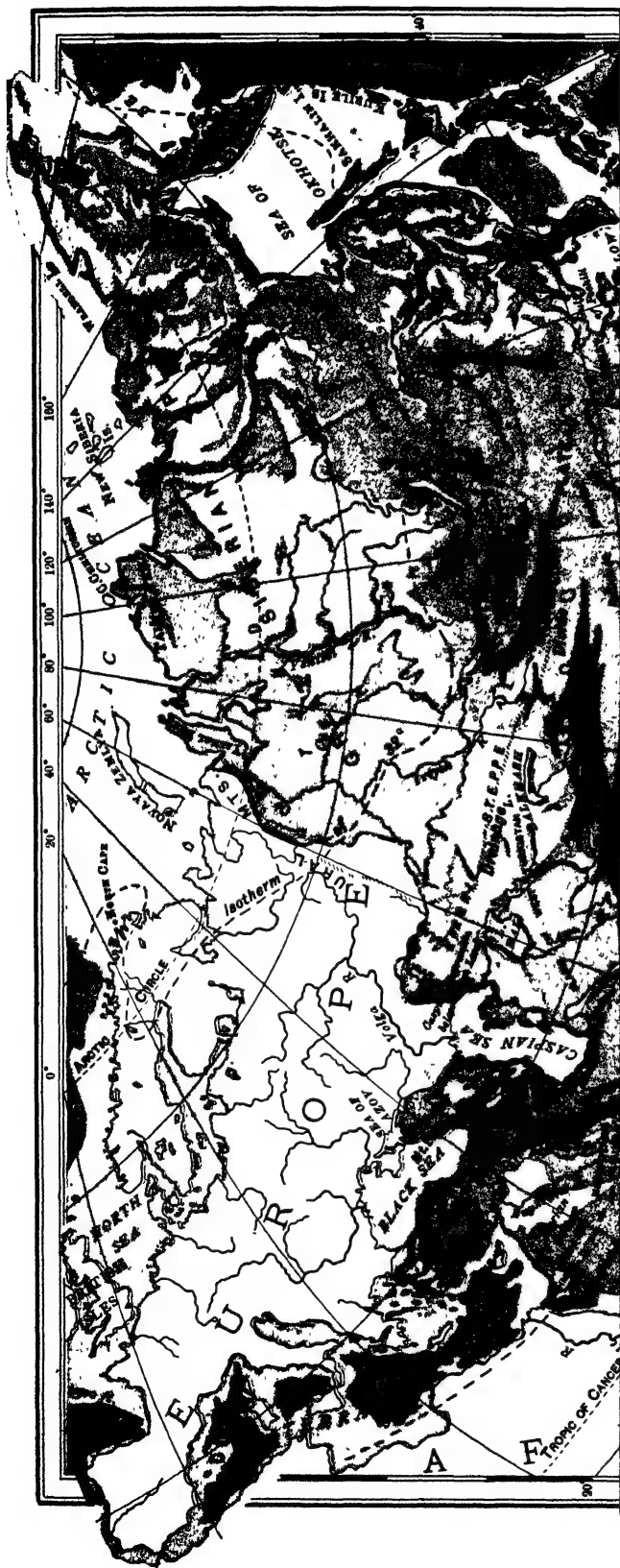
being lost in the sand or falling into lakes that have no outlet. The chief rivers in western Asia are the Tigris and Euphrates, that rise in the Armenian plateau and fall into the Persian Gulf; the Indus, from the Tibetan plateau, flows through northwestern Hindustan and falls into the Arabian Sea; the Ganges, which rises in the Himalayas and flows eastward through northern Hindustan, and the Brahmaputra, which rises in Tibet and flows through Assam and Bengal, both enter the Bay of Bengal; the Irrawaddy and the Salween, rising in the mountains of the Indo-Chinese Peninsula, and both flowing through Burma, likewise enter the Bay of Bengal; the Mekong or Cambodia, the largest river of this peninsula, has its sources in the same mountains, and flowing southeastward enters the South China Sea; the Yang-tse and the Hoang-Ho, the two great rivers of China, rise in the Tibetan plateau; and enter the ocean after a winding easterly course; the Amur, the only other great river of eastern Asia, rises in Mongolia, and after a circuitous course enters the Sea of Okhotsk; the great rivers of northern Asia, the Lena, Yenisei, and Obi, have already been mentioned. The Yenisei is believed to have a length of 3,400 miles, the Yang-tse of at least 3,000, the Lena of 2,770, the Hoang-Ho of 2,600. The basin of the Obi, including of course those of its tributaries, the Tobol and the Irtysh, is believed to be the largest of any river in the world, except the Amazon and the Mississippi, being considerably over 1,000,000 square miles in area.

The largest lake of Asia is the Caspian Sea, which, however, is partly in Europe, its largest tributary being the Volga. The chief Asiatic rivers falling into this sea are the Kur from the Caucasus, the Aras from Armenia, and the Atrek from northern Persia—the river Ural being partly European, partly Asiatic. The Caspian lies in the centre of a great depression, being 83 feet below the level of the Sea of Azof. East from the Caspian, as already mentioned, is the Sea of Aral, which, like the Caspian, has no outlet, and is fed by the rivers Amu Daria and Syr Daria. Its area is estimated at 27,000 square miles. Still farther east, to the north of the Thian-Shan Mountains, and fed by the Ili and other streams from this system, is Lake Balkash, a somewhat crescent-shaped sheet of water, with an area of 8,400 square miles. The lake has no outlet; its water is clear but very salt and disagreeable. There are also several other smaller lakes in this region, such as Issik-Kul, Kara-Kul, Ala-Kul, Baratala, etc. In the south of Siberia, between lon. 104° and 110° E., is Lake Baikal, a mountain lake from which the Yenisei draws a portion of its waters; its area is estimated at about 12,500 square miles. In the very centre of the continent is the Lob Lake, or Lob Nor, to which all the drainage of eastern Turkestan converges, being conveyed to it by the Yarkand, Kashgar, and other streams. These unite to form the Tarim River, which, from the source of the Yarkand, has a total length of over 1,200 miles. Lob seems to be rather a swampy tract than a lake proper. On the borders of Afghanistan, Persia, and Baluchistan, is a similar swampy lake that receives the Helmund and other streams from Afghanistan. Of the numerous lakes in Tibet Dangra-yum Nor and

Tengri Nor seem to be the largest; the former is 45 miles long and 25 broad.

Geology.—Though in population and history the most ancient continent, geologically speaking Asia is considered, as regards its present aspect, to be one of the newest. The principal mountain chains are composed largely of granitic rocks. The Himalayan range of mountains bears a striking resemblance in geological structure to the Alps; they are composed of granite gneiss and mica-schist, with syenite and amphibolites or trap-rocks, particularly primitive greenstone; the Altai Mountains contain granite in layers without alternation of gneiss, argillaceous schist in contact with greenstone, and containing augite, jasper, calcareous rocks, argentiferous lead ore, and copper. The ramifications of the Altai into Russian Asia contain also coal-grit, schists, quartz, and greenstone, rich with lead, silver, and auriferous sand. The lower ranges are covered with transported layers of rolled stones of granite, gneiss, and porphyry, in which are found agates, carnelians, and chalcidones. In the Kuen-Lun group are found rubies, lapis-lazuli, and turquoises. In the eastern part of the Urals the granite, of which the chain is composed, along with gneiss and other rocks, is extremely rich in iron and copper. The Caucasus contains granite, argillaceous schist, and basaltic porphyry. The great plains of northern India, Mesopotamia, central Asia, and Siberia are regarded as of very recent geological origin. From various indications many geologists are of opinion that the greater part of western Asia was occupied at no very distant period by an ocean, of which the Caspian and Aral Seas are the remains. It is also conjectured that a continental area extending across the Indian Ocean united Asia during the Permian period to Africa and Australia. Siberia is supposed to have been twice submerged during the Palæozoic and the later Tertiary period. A line of volcanic action extends on the eastern coast from Kamchatka through the Philippines and the Malay Archipelago to Aracan in the Bay of Bengal. In Kamchatka there are eight or nine active volcanoes; in the interior of the continent there appear to be none at present active.

Climate, Soil, etc.—The size of Asia, the great altitudes and depressions of the continent, along with the variations of latitude and the disposition of sea and land, etc., afford an inexhaustible source of complexity in the variety and distribution of climate. In Tibet, with a mean elevation of about 15,000 feet, the climate is rigorous, combining great cold with drought; vegetation is scanty, trees almost absent, and the population mostly nomadic; except in the lower valleys, where there is an agricultural population, it is very sparse. The climate of central Asia generally presents extremes of heat and cold, and great deficiency of rain. It has accordingly a deficient vegetation and a scanty nomadic population. The great region of Siberia, which, as already mentioned, is a level or slightly undulating plain, lying wholly within the temperate and frigid zones, has a climate which generally resembles that of similar latitudes in Europe, with the exception of greater heat and drought in summer and greater cold in winter. The rainfall is very moderate, but the drainage is deficient and the soil often becomes



ASIA

swampy. The vegetation is scanty, consisting mostly of grasses and shrubs in the plains and pine forests on the mountains. There is very little land under cultivation and the population is very thin. The northern part of China to the east of central Asia has a temperate climate with a warm summer, and in the extreme north a severe winter. It is well watered and wooded, possesses a fertile and well-cultivated soil yielding the usual products of temperate regions, and is thickly peopled. The district lying to the south of the central region, comprising the two Indian peninsulas, southern China, and the adjacent islands, presents the characteristic climate and vegetation of the southern temperate and tropical regions. Here, however, the modifying effects of altitude come most largely into play, and every variety of climate and form of vegetation is to be found on the slopes of the Himalayas, and the mountains and plains of southern India and of the eastern peninsula. The part of Asia south of the Himalayas, though not all lying within the tropics, is all subject to tropical influences. Among the principal of these may be reckoned the effects of the tropical heat upon the air-currents. To this cause are due the trade-winds, which, carrying the moisture of the southern seas to the continents to be condensed by the mountain masses against which they strike, by determining the rainfall of the various continental districts, and affecting the size and course of the rivers, produce so many climatic effects. More local in their effects as well as arbitrary in their occurrence, and consequently fatal in their violence, are the cyclones, or circular storms, common in the Bay of Bengal and the China Sea. The normal directions of the monsoons are northeast and southwest; the northeast monsoon begins in April and the southwest in October; but the direction, duration, and intensity of these winds are greatly modified, especially on land, by local circumstances. The soil of the southern regions is usually good, and where moisture is sufficient vegetation is rich and even exuberant. The soil of India is so finely comminuted that it has been said it is possible to go from the Bay of Bengal to the Indus and return again to the sea without finding a single pebble. The rainfall in those regions is extremely irregular. There are belts where hardly any rain falls at all, others of moderate, and others of very heavy rainfall. On the Khasia Hills, to the northeast of the delta of the Ganges and Brahmaputra, the heaviest rainfall in the world takes place, the average fall observed being 550 inches a year. The principal period of rain is during the southwest monsoon. On the mountains which directly face the winds, charged with vapor as they come from the sea, the rain will fall in abundance, while they pass over intermediate plains without parting with their moisture. The rainfall, the course of the rivers, and the irrigation and fertility of the plains of India is accordingly determined by the position of the Himalayas, the Ghats, and other mountain ranges. The high plateau which extends from Asia Minor to the Indus has a temperate climate, with some extremity of heat in summer and cold in winter. Rain falls chiefly in winter and spring. The eastern part of this plateau is deficient in rain, and the soil is poor and unproductive, the western portion, consisting of Asia Minor, is more

favorable of nature. The desert character of large parts of Arabia, Persia, and Baluchistan has already been alluded to. Some parts of the coast of Arabia, as Yemen and Oman, are fertile, but the greater part, especially on the Red Sea, is barren and desolate. A desert belt surrounds an interior plateau of 1,000 to 3,000 feet in height, and of moderate fertility. Syria is divided between hilly and fertile and low desert tracts. The Japanese Islands, which are traversed by mountains of considerable elevation, and extend over about 15° of latitude, experience a great variety of climates. In the north the climate is rigorous, owing to the Siberian winds; in the south it is mild. The eastern coast is milder than the west, being sheltered by the mountain ranges from the cold winds of the continent. The country generally is fertile and populous. The character and productions of the other islands are mostly tropical.

A greater extreme of cold is reached in North America than in northern Asia, the mean temperature of the east coast of Siberia being above the zero of Fahrenheit; and the heat of southern Asia is less than that of Africa, which has more land lying within the tropics. In Siberia the extremes of temperature are great, exceeding 100° between the mean of the hottest and coldest month on the coast, and being commonly over 60° throughout the country. As the equator is approached the extremes of temperature diminish till at the southern extremity of the continent they approach within 5°. The highest temperature attained in southern Asia is about 112°, the highest mean about 82°. The summers of the northern latitudes, though shorter, attain a maximum of heat not much short of the tropics, the greater length of the day compensating for the less intensity of the mid-day heat. On the Persian plateau the summer heat is increased by the want of rain, and the severity of the winter by the elevation.

Vegetation.—The plants and animals of northern Asia generally resemble those of similar latitudes in Europe, though the extremes of climate are greater. The plateau extending from Asia Minor to the Himalayas resembles southern Europe in its productions, and the desert belt of Asia has an affinity to the African desert. The characteristic types of Siberia are continued to the high regions of central Asia. The community of type with European forms also extends to North China, where is developed besides a relation with the types of North America. The whole of northern Asia differs from Europe more in species than in genera of vegetable productions. Oaks and heaths are absent in Siberia. The principal mountain trees are the pine, larch, and birch; the willow, alder, and poplar are found in lower grounds. The cultivated plants of Asia Minor and Persia resemble those of southern Europe. In the central region European species reach as far as the western and central Himalayas, but are rare in the eastern. They are here met by Chinese and Japanese forms. The lower slopes of the Himalayas are clothed almost exclusively with tropical forms; higher up, between 4,000 and 10,000 feet, is the region of forests and cultivation, producing all the types of trees and plants that belong to the temperate zone, and having extensive forests of conifers; in the east forest trees are met with at a height of 13,000 feet.

ASIA

Rhododendrons extend to 14,000 feet, and phanerogamous plants are found at the height of 19,500 feet. The southeastern region, including India, the Eastern Peninsula, and China, with the islands, contains a vast variety of indigenous species, varying with the humidity of the climate and the elevation, the forms of higher latitudes being represented on the mountains. In this region we find growing wild a number of plants that have become of the utmost importance to man, such as the sugar-cane, rice, cotton and indigo, pepper, cinnamon, cassia, clove, nutmeg, and cardamoms, banana, cocoanut, areca and sago palms; the mango and many other fruits, with plants producing a vast number of drugs, caoutchouc and gutta-percha. The forests of India contain the oak, teak, sal, deodar, and other timber woods, besides bamboos, palms, sandal-wood, laurels, fig-trees, etc. The Malay Peninsula contains dense forests of similar kinds. The cultivated plants of India include wheat, barley, rice, maize, millet, sorghum, tea, indigo, jute, opium, etc. North of the tropic wheat is sown in November, and reaped early in April, and a crop of rice or other tropical cereal is sown in June and July, and reaped in September and October. Wheat and barley do not grow in southern India, the winter not being sufficiently severe to prepare the ground for them. Cotton, indigo, sugar, tea, tobacco, coffee, pepper, plantains, mangoes, etc., are cultivated in China. Of the Chinese flora the larger portion resemble the Indian, while many are local. In North China, the country between it and the Amur (Manchuria), and the Japanese Islands, large numbers of deciduous trees occur, such as oaks, maples, limes, walnuts, poplars, and willows, the genera being European but the individual species Asiatic. Among cultivated plants are wheat, and in favorable situations rice, cotton, the vine, etc. Japan and the northern parts of this region are rich in species of the pine tribe. According to elevation the islands of the Asiatic Archipelago display an equal diversity with the mainland, the more tropical types being represented on the lower elevations, the more northern on the higher. Coffee, rice, maize, etc., are extensively grown in some of the islands. A line of demarkation called Wallace's line has been drawn at the Strait of Macassar, at which the flora and fauna of Australia begin to appear, and gradually become more pronounced as the distance from Asia and the proximity to Australia increases. The variety of plants of the desert region of Arabia, Persia, and Baluchistan is comparatively small. The predominance of a few species gives character to the whole region. Vegetation is most abundant in spring, when herbaceous and bulbous plants, which extend through this region from Syria to the Himalayas, are abundant. In Arabia Felix, and the warmer valleys of Persia, Afghanistan, and Baluchistan, where the hills are high enough to afford a sufficient rainfall, aromatic shrubs are abundant. Wheat, barley, cotton, and indigo are cultivated in Arabia, and the date-palm flourishes in the desert. On the mountain slopes of western Arabia (Arabia Felix) the coffee-plant, which has probably been derived from Africa, is cultivated. Gum-producing acacias are, with the date-palm, the commonest trees in Arabia; the latter also extends through Persia, and even reaches the shore of the Caspian.

Fleshy plants are characteristic of the most arid portions. In the higher parts of Persia and Afghanistan numerous forms of *Umbelliferae* of great size, as well as thistles and the borage tribe, are abundant. African forms are found not only extending from the African desert along the desert region of Asia, but from south Africa to Ceylon. The Caspian lowlands is the tract where the saline vegetation that is spread over the whole region of steppes and deserts has its greatest development. This region is regarded as the native country of the melon.

Zoology.—There is a still closer resemblance in the fauna than in the flora of northern Asia to that of Europe. Asia south to the Himalayas, together with Europe and North Africa, forms a continuous region, which Dr. Sclater has designated as the Palearctic; southeastern Asia, with Sumatra, Java, Borneo, and the Philippines, he calls the Indian region; Africa south of the Atlas, with Arabia, Palestine, South Persia, the dry part of Baluchistan and Sind, form the Ethiopian region; Celebes and the other islands beyond Wallace's line, with Australasia, the Australian region. Nearly all the mammals of Europe occur in northern Asia, with numerous additions to the species. *Quadruman*a are rare, *Carnivora* numerous, especially bears, wolves, and weasels. Moles, shrews, and hedgehogs are common among *Insectivora*. Rodents are represented by marmots and the pika or tailless hare. There are numerous species of wild sheep, antelopes, and deer. Of the last the musk-deer and sambar are characteristic. The ornithology of Europe and northern Asia are identified to a still greater extent. A large majority of European species extend over northern Asia as far as Japan. The pheasant family in the wild state is peculiar to central Asia, the golden pheasant and several other species belonging to the northeast. The genera and species of passerine birds is very numerous. In the Indian region there are several peculiar species of the *Quadruman*a or monkey tribe. Among the distinctive forms of this region is the elephant, the Asiatic species being distinct from the African. The lion (now almost extinct), tiger, leopard, cheetah, jungle-cat, ounce, bears, civets, ichneumons, and other carnivorous animals are found. The lion inhabits Arabia, Persia, Asia Minor, Baluchistan, etc., and extends as far east as India, being now, however, confined to Guzerat. The tiger is the most characteristic of the larger Asiatic *Carnivora*. It extends from Armenia across the entire continent, being absent, however, from the greater portion of Siberia and from the table-land of Tibet; it extends also into Sumatra, Java, and Bali. The horse, ass, and camel have their true home in Asia. In the Indian region we also find the rhinoceros, buffalo, ox, deer, squirrels, porcupines, as well as various species of *Edentata*. In birds nearly every order except ostriches is represented. Among the most interesting forms are the hornbills, the peacock, the Impey pheasant, the tragopans, and other gallinaceous birds, the pheasant family being very characteristic of the region. The desert region, extending from Arabia to Sind, is chiefly distinguished by the absence of many Indian forms and the presence of some African ones, which, however, are not widely spread, most of them being limited to Arabia and Syria. In

ASIA

the Malay Archipelago marsupial animals first occur in the Moluccas and Celebes, while various mammals common in the western part of the archipelago are absent. A similar transition toward the Australian type takes place in the species of birds. Of marine mammals the dugong is peculiar to the Indian Ocean; in the Ganges is found a peculiar species of dolphin. The chief haunts of the *Reptilia* of Asia are the northern portion of Hindustan, the south-eastern peninsula, China, and the islands of Ceylon, Sumatra, and Java. At the head of the reptiles stands the Gangetic crocodile, frequenting the Ganges and other large rivers; the helmeted crocodile and the double-crested crocodile are numerous in various quarters, both insular and continental. Among the serpents are the cobra da capello and a species of *Trigonocephalus*, both among the most deadly snakes in existence; there are also large boas and pythons, besides sea and fresh-water snakes. There are also a number of species of frogs and toads and of fresh-water tortoises, as well as chameleons and other lizards. The seas and rivers of Asia produce a great variety of fish. The *Salmonidae* are found in the rivers flowing into the Arctic Ocean, but not in those of southern Asia. Large numbers are caught. Trout are found in the feeders of the Indus and the Caspian. Sturgeons abound in the Black Sea and the Caspian. Two rather remarkable kinds of fishes are the climbing perch and the archer fish. The well-known gold-fish is a native of China.

Asiatic Races.—The Mongolian race is the most numerous in Asia. It occupies the Chinese empire, Tartary, and probably Japan, with part of the Indo-Chinese Peninsula. It is partly settled, as in China, Japan, and the peninsula; partly nomadic, as in Tartary and Mongolia. The Aryan is the next in numbers, and the most civilized of the Asiatic races. It was until the Mohammed conquest the dominant, as it is still the most numerous, race in India. It also prevails in Persia and in the middle region from Afghanistan to Asia Minor. The Semitic race is widely spread in southwestern Asia, and formerly at least extended to Africa. The Dravidian race in South India, the Malays in the eastern peninsula, and other races locally distributed, have no well-defined relation with the larger races. The Dravidians are variously associated with the Mongols and the Australians. The latter theory is connected with the hypothesis of a southern continent, which also connects these races with Africa. See ETHNOLOGY.

Political Divisions.—A large portion of Asia is under the dominion of European powers. Russia possesses the whole of northern Asia (Siberia) and a considerable portion of central Asia, together with a great part of ancient Armenia, on the south of the Caucasus; Turkey holds Asia Minor, Syria, and Palestine, part of Arabia, Mesopotamia, etc.; Great Britain rules over India, Ceylon, a part of the Indo-Chinese Peninsula (Upper and Lower Burma), and one or two other possessions; France has acquired a considerable portion of the Indo-Chinese Peninsula (Cochin-China, Anam, Tonkin, Cambodia), and has one or two small settlements besides, while to Holland belong Java, Sumatra, and other islands or parts of islands in the Asiatic or Malay Archipelago. The

chief independent states are the Chinese empire, much the most populous of all; Japan, Korea, Siam, Afghanistan, Persia, and the Arabian states. The total population of the continent is estimated at 905,000,000.

Religions.—Asia has been the birthplace of religions; the Jewish, Buddhist, Christian, and Mohammedan having their origin in Asia, where they grew up under the influence of still older religions, the Babylonian and that of Zoroaster, both also of Asiatic origin. At present the inhabitants of Asia belong chiefly to the Buddhist religion, which has 530,000,000 to 560,000,000 of followers, that is, nearly one third of mankind. The old faith of Hinduism has 187,000,000 of followers in India. Most of the inhabitants of western Asia, as also of part of central Asia, follow the religion of Islam; they may number about 90,000,000. The Christians number about 20,000,000 in Armenia, Caucasus, Siberia, and Turkestan. Jews are scattered mostly in western and central Asia. A few fire-worshippers, Guebbers or Parsi of India and Persia, are the sole remnant of the religion of Zoroaster; while vestiges of Sabaism are found amidst the Gesides and Sabians on the Tigris.

Civilization.—There are to be found in Asia all varieties of civilization, the primitive tribes of northeastern Siberia, the confederations of nomadic shepherds, and great nations in possession of a common stock of national customs, beliefs, and literature, like China; the tribal stage; the compound family, forming the real basis of China's social organization; the rural community, both of the Indian and Mussulman type; the loose aggregations of Tchuktchis, having no rulers and no religion beyond the worship of forces of nature, but professing with regard to one another principles of morality and mutual support often forgotten in higher stages of civilization; and despotic monarchies with a powerful clergy. So also in economic life. While the tribes of the northeast find their means of subsistence exclusively in fishing and hunting, carried on with the simplest implements, among which stone weapons have not yet quite disappeared, and the tribes of central Asia carry on primitive cattle-breeding and lead a half-nomadic life, others are agriculturists, and have brought irrigation (in Turkestan) to a degree of perfection hardly known in Europe.

Internal Communication.—Caravans of camels are the chief means of transport for goods and travelers in the interior; donkeys, yaks, and even goats and sheep are employed in crossing the high passages of the Himalayas; horses are the usual means of transport in most parts of China and Siberia, and in the barren tracts of the north the reindeer and, still farther north, the dog, are made use of. Fortunately the great rivers of Asia provide water communication over immense distances. The deep and broad streams of China, allowing heavy boats to penetrate far into the interior of the country, connect it with the sea; a brisk traffic is carried on along these arteries. In Siberia the bifurcated rivers supply a waterway, not only north and south along the course of the chief rivers running toward the Arctic Ocean, but also west and east; thus a great line of water communication crosses Siberia, and is, with but a few interruptions, continued in the east by the Amur, navigable for more

than 2,000 miles. In the winter the rivers and plains of Siberia become excellent roads for sledges, on which goods are still chiefly transported.

Railways.—In 1900 the lines in existence had a total length of about 30,000 miles, of which two thirds belonged to British India. The portions of the trans-Caspian and trans-Siberian railways already constructed had a length of 3,200 miles. A number of European syndicates held concessions for 3,600 miles of railroads in China, which will traverse regions rich in minerals and agriculture; many of these lines were then in process of construction. The Chinese government owned about 300 miles of railway. The lines are very remunerative, especially that from Peking to Tien-Tsin. Japan is well provided with railroads; the length being 3,200 miles. French Indo-China had only 120 miles, but the French possessions in Cochinchina, Anam, and Tonkin are expected soon to have 2,400 miles, which will greatly help to develop their mineral and agricultural resources. The Dutch Indies are well supplied. Java alone has 1,000 miles. There are as yet no railroads in Persia of any consequence; but Turkey operates 1,500 miles in Asia, and 600 miles more are in construction or projected.

Telegraph communications are in a much more advanced state than the roads. St. Petersburg is connected by telegraph with the mouth of the Amur and Vladivostok (on the frontier of Korea); while another branch, crossing Turkestan and Mongolia, runs on to Tashkend, Peking, and Shanghai; Constantinople is connected with Bombay, Madras, Singapore, Saigon, Hong-Kong, and Nagasaki in Japan; and Singapore stands in telegraphic communication with Java, and Port Darwin in Australia. Finally, Odessa is connected by wire with Tiflis in Caucasus, Teheran, and Bombay.

Trade.—Notwithstanding the difficulties of communication a brisk trade is carried on between the different parts of Asia, but there is no possibility of arriving at even an approximate estimate of its aggregate value. The maritime exports to Europe, the United States, and overland to Russia, have an annual value of about \$900,000,000, and the imports of about \$750,000,000. Asia deals chiefly in raw materials, gold, silver, petroleum, teak, and a variety of timber-wood, furs, raw cotton, silk, wool, tallow and so on; the products of her tea, coffee, and spice plantations; and a yearly increasing amount of wheat and other grain. Steam industry is only now making its appearance in Asia, and, although but a very few years old, threatens to become a rival to European manufacture. Indian cottons of European patterns and jute-stuffs already compete with the looms of her European sister countries. Several of the petty trades carried on in India, China, Japan, Asia Minor, and some parts of Persia, have been brought to so high a perfection that the silks, printed cottons, carpets, jewelry, and cutlery of particular districts far surpass in their artistic taste many like productions of Europe. The export of these articles is steadily increasing, and Japan supplies Europe with thousands of small articles—applications of Japanese art and taste to objects of European household furniture.

History.—The origin of the name Asia is in-

volved in obscurity, and it is not certainly known whether it arose among the Greeks or was borrowed by them from some Asiatic people. The Greeks seem to have applied it originally only to Lydia, the part of the continent with which they first became acquainted. Modern scholars are inclined to believe that the name Asia is connected with the Sanskrit *ushas*, the dawn, as Europe may be connected with the Hebrew *ereb*, the west or the sun-setting.

The oldest historical documents are of Asiatic origin, and next to the immediately contiguous kingdom of Egypt Asia possesses the oldest historical monuments in the world.

The oldest historical monuments in Asia are those of Assyria (see ASSYRIA), and with them are associated traditions which carry us back to a remote and indefinite antiquity. A similar vague antiquity belongs to the historical traditions of India and China. Criticism, however, reduces all these claims to moderate dimensions, and assigns to the oldest ascertained facts a period not more remote than some 4,000 years from the present.

The earliest facts in the history of Asia, apart from documents and monuments, consist in the migrations of races, the evidence of which is derived from tradition, from language, from customs, and from religion. The earliest known seat of the Aryan race was on the banks of the Oxus. Hence probably from the pressure of the Mongolian tribes to the north they spread themselves to the southeast and southwest, pressing upon the Dravidian inhabitants of India and the Semitic races of southwestern Asia. Finally they drove the Dravidians to the south of India and occupied Persia and other parts of western Asia, spreading into Europe. It is a remarkable circumstance that in this invasion the Aryans appear to have acquired the use of letters from the peoples with whom they came in contact, the Dravidian letters being borrowed in India and the Semitic in Persia as the original basis of the Sanskrit and Zendic alphabets. At a later period the Greeks likewise adopted a Semitic alphabet from the Phœnicians. The Semites have spread within historical times into northern Africa, and their migrations had probably taken a similar course before they were recorded in history. A large portion of the Mongols are still, as they have always been, a nomadic race, and their migrations, carrying everywhere the terror of predatory arms, have spread from the settled part of their own race in China along the north of Asia into northern Europe.

The early religion of the Aryan race,—a nation of shepherds,—divided itself after their separation into two related but widely different developments, Brahmanism and Zoroastrianism. (See INDIA (*Religion*); ZEND-AVESTA.) The former became rich in mythological, theological, and philosophical literature; but historical literature properly so called is wanting, and consequently there is a great absence of certainty with regard to the dates of early events. The war which the Mahābhārata (see SANSKRIT LANGUAGE AND LITERATURE) professes to narrate is believed to be the earliest event in Indian history that can be regarded as historical, and probably took place about 1200–1400 B.C. In China authentic history extends back prob-

ASIATIC ART.



1 Dancing Staff from Sumatra
2 Feticch from Nias
3 Aino Shuttle

4 Bashkir Ornament
5 Bronze Buddha
6 Helmet

7 Gauntlet
8 Japanese Kettle, Silver and Bronze
9 Singhalese Work

ASIA

ably to about 1100 B.C., with a long preceding period of which the names of dynasties are preserved without chronological arrangement. The kingdoms of Assyria, Babylonia, Media, and Persia, alternately predominated in southwestern Asia. The arms of the Pharaohs also extended into Asia, but their conquests there were short-lived. From Cyrus (B.C. 559), who extended the empire of Persia from the Indus to the Mediterranean, while his son, Cambyses, added Egypt and Libya to it, to the conquest of Alexander (B.C. 330), Persia was the dominant power in Asia. The administration of Persia was not without vigor and policy, yet the Macedonian conquest was an event of great importance to Asia, bringing it, along with northern Africa, into closer relation with the more advanced and progressive continent of Europe. The division of Alexander's empire led to the protracted struggle between the Greek dynasties of Egypt and Syria, which ended in the absorption of both kingdoms in the Roman empire. After the unfortunate issue of the second Punic war Hannibal took refuge with Antiochus the Great of Syria, who, in the course of his conquests, had come in contact with the Romans, and was at length incited to try his strength with them. In the course of the war with Antiochus L. Scipio, together with his brother, the conqueror of Carthage, passed into Asia. The kingdom of Antiochus was spared after his overthrow; but in B.C. 65 Syria became a Roman province. The Roman empire ultimately extended to the Tigris.

The knowledge of Asia possessed by the Greeks and Romans was at its widest extent very limited. The countries with which they were best acquainted were naturally in the west. China they knew as the country of the Seres or Sinæ, and the northern portions of the continent, inhabited by predatory Mongol tribes, were vaguely designated as Scythia. Of India the northwestern and western parts were known, and Ceylon likewise, under the name of Taprobane. The country traversed by the Hindu Kush, and the sources of the Oxus, was known as Bactria; that between the Oxus and the Jaxartes as Sogdiana; a large and vaguely defined central district, including Persia, was known as Ariana. Ptolemy had some acquaintance with the Indian Peninsula, with the table-land of central Asia, with the Himalayas (Imaus) and China. The better known countries of the southwest comprised Asia Minor, Armenia, Arabia, Persia, Media, Parthia, Mesopotamia, Babylonia, Assyria, Syria.

Soon after the most civilized portions of the three continents had been reduced under one empire the great event took place which forms the dividing line of history. Christianity spread rapidly in the Roman empire; but Armenia was the first country which received it as a national religion. In A.D. 226 the Parthian monarchy which had arisen in eastern Persia about B.C. 250, and had disputed the empire of Asia with the Romans, was overthrown by the revived Persian dynasty of the Sassanidæ. The empire of Asia was now disputed with the Romans by the Persians. In the revived Persian empire the Magian religion was restored, and after the establishment of Christianity in the Roman empire religious jealousy embittered the feud between the two powers. The possession of Ar-

menia was the subject of a protracted struggle between them; but its religion inclined it to the Roman alliance. The Tigris formed the most permanent boundary between the two empires, neither being able long to maintain any conquests beyond it. Christianity was persecuted in the Persian empire, and could not extend itself freely beyond the Roman limits. After the division of the Roman empire (A.D. 364) the struggle continued between the eastern and the Persian empires until the rise of a new power destined to absorb them both. While the Eastern empire was struggling more and more feebly with the Persians, the Mongols, and the barbarians of Europe, a new religion arose in Arabia (A.D. 622), which gathered around it a band of enthusiasts, small at first, but inspired with the most ardent zeal of proselytism. The central tenet of the unity of God gave them the sympathy of the Monophysite sect, which, persecuted in the empire, was powerful in Egypt, Syria, Mesopotamia, and Armenia. Arabia, the country of the Prophet, soon gave its adherence to the new faith. The sword was consecrated as the instrument of its propagation. Persia was the first great conquest of the Arabians. Syria and Egypt soon fell before their arms, powerfully aided by the defection of the heretics of the empire, and within 40 years of the celebrated flight of Mohammed from Mecca, which constitutes the era of his followers, the sixth of the Caliphs, or successors of the Prophet, was the most powerful sovereign of Asia. Heraclius, one of the most warlike, and in the early part of his reign one of the most successful of the eastern emperors, had succumbed to this torrent of conquest, and his successors trembled at the names of their rivals. The successors of Mohammed were at first austere and simple in their manners, and narrow and zealous in their religious faith; but from the accession of Moawiyah (A.D. 661), the time when the seat of empire was transferred first to Damascus and subsequently to Bagdad, the throne of the Caliphs was as splendid as it was powerful. The generous blood of Arabia, nourished by more genial climes, showed an aptitude for all that is great, not only in military achievement, but in learning, science, literature, and art. The empire was soon divided, but wherever the Arab sway prevailed a liberal patronage of learning and toleration even of speculative inquiry distinguished it. The career of conquest was not soon ended. It spread with astonishing rapidity over Africa and Europe, and was finally checked only by the fatal divisions which originated in the disputes between the descendants of the Prophet and the dynasty of the Ommyades, descended from his mortal foe and tardy convert, Abu Sophian.

Among the alternate protectors and oppressors of the eastern Roman empire were the various Mongol tribes, whose predatory course led them to the west. In these also the Arab rulers found dangerous converts, who first supplied the place of their own troops, grown effeminate with luxury, and then supplanted themselves in the throne of which they had superseded the natural defenders. While the Caliphs of Bagdad still held a nominal sway, subject to the dictation of their Turkish guards, Mahmud, the Mongolian Mohammedan ruler of Ghazni, asserted his independence (999), con-

ASIA; ASIA MINOR

quered India, and established the Mogul dynasty. Another revolt from the empire of Mahmud founded the Seljuk dynasty, which established itself in Aleppo, Damascus, Iconium, and Kharism, and which was distinguished for its struggles with the Crusaders. Othman, an amir of the Seljuk sultan of Iconium, established the Ottoman empire in 1300. About 1220 Genghis Khan, an independent Mongol chief, made himself master of central Asia, conquered northern China, overran Turkestan, Afghanistan, and Persia; his successors took Bagdad and extinguished the remains of the Caliphate. In Asia Minor they overthrew the Seljuk dynasty. His grandson, Kublai Khan, conquered China in 1260. The successors of Genghis Khan also invaded Russia, and the Christian empire established by Vladimir was overthrown by the Golden Horde, led by his grandson Batu (1240). Timur or Tamerlane, who professed to be a descendant of Genghis, carried fire and sword over northern India and western Asia, defeated and took prisoner Bajazet, the descendant of Othman (1402), and received tribute from the Greek emperor. The Ottoman empire soon recovered from this blow, and Constantinople was taken and the Eastern empire overthrown by the Sultan Mohammed II. in 1453. China recovered its independence about 1368 and was again subjected by the Manchu Tartars (1618-45), soon after which it began to extend its empire over central Asia. Siberia was conquered by the Cossacks on behalf of Russia (1580-4). The same country effected a settlement in the Caucasus about 1786, and has since continued to make steady advances into central Asia. The discovery by the Portuguese of the passage to India by the Cape of Good Hope led to their establishment on the coast of the peninsula (1498). They were speedily followed by the Spanish, Dutch, French, and British. The struggle between the two last powers for the supremacy of India was completed by the destruction of the French settlements (1760-65), and from that time the conquest of India by the British progressed with uninterrupted success. In 1858 India came directly under the British crown. The extension of the influence and possessions of European powers, especially Russia, Great Britain, and France, has latterly been a most striking fact in Asiatic history. For particular phases of the modern history of Asia see CHINA; KOREA; JAPAN; MANCHURIA; RUSSIA AND TURKEY. Also BOXERS and TRIPLE ALLIANCE

Asia, Central, a designation loosely applied to Asiatic territory east of the Caspian, also called Turkestan, and formerly Tartary. The eastern portion belongs to China, the western now to Russia. Russian central Asia comprises the Kirghiz Steppe (Uralsk, Turgai, Akmolinsk, Semipalatinsk, etc.), and what is now the government-general of Turkestan, besides the territory of the Turkomans, or Tanscaspia and Merv. The entire area is about 1,350,000 square miles. See Bouvalot, 'Through the Heart of Asia' (1889); Phibbs, 'Central Asia' (1899).

Asia Minor (Asia the Less) is the extreme western peninsular projection of Asia, forming part of Turkey in Asia. The name is not very ancient; originally the Greeks seem by Asia

to have meant only the western part of Asia Minor, but with their geographical knowledge the scope of the name Asia gradually widened. The late Greek name for Asia Minor is Anatolia—*Anatolē*, "the East," whence is formed the Turkish *Anadöli*. Asia Minor includes the peninsula; the eastern boundary, somewhat artificial, being a line from the Gulf of Skanderoon to the upper Euphrates, and thence to a point east of Trebizond. The area of the peninsula exceeds 220,000 square miles. It constitutes the western prolongation of the high table-land of Armenia, with its border mountain ranges. The interior consists of a great plateau, or rather series of plateaus, rising in gradation from 3,500 to 4,000 feet, with bare steppes, salt plains, marshes, and lakes; the structure is volcanic, and there are several conical mountains, one of which, the Ergish-dagh (Argæus), with two craters, attains a height of 11,830 feet, towering above the plain of Kaisarieh, which has itself an elevation of between 2,000 and 3,000 feet. The plateau is bordered on the north by a long train of parallel mountains, 4,000 to 6,000 feet high, and cut up into groups by cross valleys. These mountains sink abruptly down on the northern side to a narrow strip of coast; their slopes toward the interior are gentler and bare of wood. Similar is the character of the border ranges on the south, the ancient Taurus, only that they are more continuous and higher, being, to the north of the Bay of Skanderoon, 10,000 to 12,000 feet, and farther to the west, 8,000 to 9,000 feet. The western border is intersected by numerous valleys opening upon the archipelago, to the northern part of which Mounts Ida and Olympus belong. Between the highlands and the sea lie the fertile coast-lands of the Levant. Of the rivers the largest is the Kizil Irmak (Halys), which, like the Yeshil Irmak (Iris), and the Sakaria (Sangarius) flows into the Black Sea; the Sarabat (Hermus) and Meinder (Mæander) flow into the Ægean.

The climate has, on the whole, a southern European character; but a distinction must be made of four regions. The central plateau, nearly destitute of wood and water, has a hot climate in summer, and a cold one in winter; the southern coast has mild winters and scorching summers; while on the coast of the Ægean there is the mildest of climates and a magnificent vegetation. On the northern side the climate is not so mild, but the vegetation is most luxuriant.

In point of natural history, Asia Minor forms the transition from the continental character of the East to the maritime character of the West. The forest-trees and cultivated plants of Europe are seen mingled with the forms characteristic of Persia and Syria. The central plateau, which is barren, has the character of an Asiatic steppe, more adapted for the flocks and herds of nomadic tribes than for agriculture; while the coasts, rich in all European products, fine fruits, olives, wine, and silk, have quite the character of the south of Europe, which on the warmer and drier southern coast shades into that of Africa.

The inhabitants, some 7,000,000 in number, consist of the most various races. The dominant race are the Osmanli Turks, who number about 1,200,000, and are spread over the whole

ASIATIC ART.



10. Dancing Staff from Sumatra
 11. Head Covering from Luzon.
 12. Hat from Borneo
 13-16. Articles from Samoa and Tongu Islands
 17. Bashkir Ornament.

18. Suit of Armor
 19. Armored Shoe
 20. Aino Quiver
 21. Mandarin's Staff in Red Lacquer.
 22. Japanese Water Bottle.

country; allied to these are the Turkomans and Yuruks, speaking a dialect of the same language. The latter are found chiefly on the table-land, leading a nomadic life; there are also hordes of nomadic Kurds. Among the mountains east of Trebizond are the robber tribes of the Lazes.

The Greeks and Armenians are the most progressive elements in the population, and have most of the trade. While the Greeks monopolize the professions, the ownership of the land is largely passing into the hands of Greeks, Armenians, and Jews. Administratively the country falls into eight vilayets or governments, with their capitals in Brusa, Smyrna, Konieh (Iconium), Adana, Sivas, Angora, Trebizond, and Kastamuni respectively. In ancient times the divisions were Pontus, Paphlagonia, Bithynia, in the north; Mysia, Lydia, Caria, in the west; Pisidia with Pamphylia, and Cappadocia, in the south; and Galatia with Lycaonia and Phrygia, in the centre. The Turkish islands of the archipelago belong, most of them, to Asia Minor.

Here, especially in Ionia, was the early seat of Grecian civilization, and here were the countries of Phrygia, Lycia, Caria, Paphlagonia, Bithynia, Lydia, Pamphylia, Isauria, Cilicia, Galatia, Cappadocia, etc., with Troy, Ephesus, Smyrna, and many other great and famous cities. Here, from the obscure era of Semiramis (about 2000 B.C.) to the time of Osman (about 1300 A.D.), the greatest conquerors of the world contended for supremacy; and here took place the wars of the Medes and Persians with the Scythians; of the Greeks with the Persians; of the Romans with Mithridates and the Parthians; of the Arabs, Seljuks, Mongols, and Osmanlı Turks with the weak Byzantine empire. Here Alexander the Great and the Romans successfully contended for the mastery of the civilized world. But notwithstanding all these wars the country still continued to enjoy some measure of prosperity till it fell into the hands of the Turks, under whose military despotism its ancient civilization has been sadly brought to ruin. Recently, considerable portions of Armenia have been absorbed by Russia. In 1878 Great Britain made a secret engagement to guarantee against Russian aggression the Asiatic dominions of the Porte.

In Asia Minor an extensive system of railroads has long been under consideration. The first survey for this proposed trunk line was made as far back as 1874, and was from Angora to Bagdad. The financial crisis of 1875 resulted, however, in the abandonment of the scheme, but it was again considered in 1888 by foreigners interested in railroad enterprise in Asia. The Suitari-to-Angora line was conceded in October of that year to the Bank of Berlin, and on 27 Nov. 1892 the first train was run. A branch line was shortly after built between Eski-Schehir and Konia and connected with the line to Smyrna. The success of this undertaking influenced the Sultan's desire to have the line extended to Bagdad across Mesopotamia, and the German syndicate was instructed accordingly. The survey was made in the winter of 1899-1900 by a commission under the presidency of the German consul-general at Constantinople. Matters were hastened by the request of the Emperor William that the work be pushed forward as rapidly as possible.

Asiarch, ä'shî-ärk, a Roman officer appointed as director-general of religious ceremonies in the province of Asia. The expression occurs in the Greek Testament, *Times de kai tôn Asiarchôn*, "And certain also of the Asiarchs" (Acts xix. 31). Properly speaking there was but one Asiarch residing at Ephesus; the others referred to were his subordinates.

A'siat'ic Broth'ers, the designation of a secret society organized in Germany about 1780. See ROSICRUCIANS.

A'siat'ic Societies, learned associations formed for the purpose of collecting and disseminating valuable information respecting the different countries of Asia. The Royal Asiatic Society of Great Britain and Ireland was established 19 March 1823. With it in 1828 was connected a very active translation committee, which publishes English, French, and Latin translations of Oriental works, occasionally accompanied with the originals. Similar societies have been formed in Asia itself, such as the Asiatic Society of Bengal at Calcutta, founded in 1784 by Sir William Jones. Since 1846 the Bibliotheca Indica,—a series of Oriental works in text and translation,—has been published under the supervision of this society at the expense of the Anglo-Indian government. There are similar societies on the Continent and in America, such as the Société Asiatique at Paris, founded in 1822, the Oriental Society of Germany (Deutsche Morgenländische Gesellschaft), founded in 1845, and the American Oriental Society.

Asimina, a-sîm'î-na, or äs'im-î-nä, **Papaw**, a genus of nine species of shrubs or small trees of the natural order *Anonaceæ*, eight of which are natives of eastern North America, the West Indies, and Mexico, with attractive foliage and large purple or whitish axillary flowers appearing in early spring, and large edible berries. Two species are cultivated for ornament and deserve more attention at the hands of horticulturists. One of these, *A. triloba*, which has produced some varieties, is the only arborescent species of the genus. It is hardy as far north as Massachusetts and produces very large seeded fruits, often more than three inches long and too highly aromatic to suit all palates. The other species, *A. grandiflora*, is found in Georgia and Florida, and is said to produce delicious fruits.

A'siphona'ta, an order of lamellibranchiate, bivalve mollusks, destitute of the siphon or tube through which, in the siphonata, the water that enters the gills is passed outward. It includes the oysters, the scallop shells, the pearl oyster, the mussels, and in general the most useful and valuable mollusks.

Ask, in Scandinavian mythology, the name of the first man created. According to the legend, the gods, Odim, Hæner, and Loder, found two trees by the seaside, an ash and an elm. From these they created the first man and first woman, Ask and Embla, and gave them the earth as their dwelling place.

Askew, äs'kü, **Anne**, an English martyr: b. 1521; d. 16 July 1546. She is described as a lady of great beauty and learning, married, much against her inclinations, to Thomas Kyme, who was as attached to the old religion as she was to the new. She was arrested for heresy

ASKHABAD — ASPARAGIN

and led before Bonner, Bishop of London, who induced her to sign a recantation. She was again arrested, however, committed to Newgate, and condemned to death as a heretic. Some days later she was suddenly removed to the Tower, and the rack was applied in the presence, and it is said even by the hands, of Wriothesley, the chancellor, who hoped to extort confession concerning those ladies of the court with whom she corresponded. Before her frame had time to recover from the effects of the rack she was carried in a chair to Smithfield, chained to a stake, and along with four others was burned to death.

Askhabad, äs'kha-bäd', the thriving administrative centre of the Russian province of Transcaspia, situated in the Akhal Tekke oasis, and occupied by Skobeleff in January 1881, after the sack of Geok Tepé. Its distance from Merv is 232 miles, from Herat 388 miles. Pop. (1897) about 20,000.

Askja, ask'ya, a volcano in the centre of Iceland, first brought into notice by an eruption in 1875. Its crater is 17 miles in circumference, surrounded by a mountain-ring from 500 to 1,000 feet high, the height of the mountain itself being between 4,000 and 5,000 feet.

Aslauga's (a-slow'gāz) **Knight**, the title of a romantic tale of mediæval chivalry, by Fredrich, Baron de la Motte, Fouqué. It was published in 1814. The story is told with simplicity and grace, and with it may be compared 'The Fostering of Aslang' in Wm Morris' 'Earthly Paradise.'

Asmai, äs'mī, or **Asmayi**, an Arabic writer, the instructor of Harun-al-Raschid: b. about 740; d. 830. His history of the kings of Arabia and Persia, prior to Islam, is of great value, while his romance of 'Antar' has been called "the Iliad of the desert."

As'manite, a variety of silica, occurring in small grains in certain meteoric irons, and now believed to be identical with tridymite (q.v.).

Asmannshausen, äs'mans-how'zēn, a Prussian village on the Rhine, in the district of Wiesbaden, below Rudesheim, celebrated for its wine, which is produced on a soil formed of blue slate. The red kind, the production of a small red Burgundy vine, is the more valuable, but retains its value only three or four years. After this time it grows worse every year, and precipitates the whole of its red coloring-matter. It is distinguished by color and taste from all other Rhenish wines.

As'mode'us, or **Asmo'dai**, in Hebrew mythology, an evil spirit which slew seven husbands of Sara, daughter of Raguel, at Rages. By the direction of the angel Raphael the young Tobias exorcised Asmodeus with the smell of a fish's liver burned on the coals, into the uttermost parts of Egypt, where the angel bound him.

As'mode'us, **The Lame Devil** ('Le Diable Boiteux'). A novel by Alain René Le Sage, first published in 1707, and re-published by the author, with many changes and additions, in 1725. It is sometimes known in English as 'Asmodeus,' and sometimes as 'The Devil on Two Sticks,' under which title the first English translation appeared, and was dramatized by Henry Fielding in 1768.

As'monæ'ans, a family of high-priests and princes who ruled over the Jews for about 130 years, from 153 B. C. See MACCABEES.

Asmus, äs'mus, **Georg**, a German-American poet: b. Giessen, 27 Nov. 1830; d. Bonn, 31 May 1892. He came to the United States to conduct some mining operations in the copper region of Lake Superior; then lived in New York until 1884, when he returned to Europe. Among the German population of the United States he had an enormous success with his 'American Sketch-Booklet' (1875), an epistle in verse, written in Upper Hessian dialect and overflowing with delicious humor. It was followed by 'New American Sketch-Booklet' (1876). He also wrote 'Camp Paradise' (1877), a story, and a collection of miscellaneous poems (1891).

Asnieres, as-nyār, a northern suburb of Paris, a favorite boating resort with the Parisians. Pop. (1897) 24,317.

Asnyk, äs'nek, **Adam**, a Polish patriot and poet: b. Kalisz, 11 Sept. 1838; d. Cracow, 2 Aug. 1897. He participated in the insurrection of 1863, for which he had to spend some years in exile in Germany. He was author of 'Poezye,' (1872-80), and several successful dramas.

Asoka, a-sō'ka, an Indian sovereign, who reigned 255-223 B. C. over the whole of northern Hindustan. He embraced Buddhism, and forced his subjects also to become converts. Many temples and topes still remaining are attributed to him.

Aso'ka (*Jonesia asoca*), an Indian tree, of the natural order *Leguminosæ*, sub-order *Casalpineæ*, with a flower, showing orange, scarlet, and bright-yellow tints. It is sacred to the god Siva, and often mentioned in Indian literature.

As'olan'do: Facts and Fancies, the latest volume of poems written by Robert Browning and published on the day of his death, 12 Dec. 1889.

Aso'pus, the name of several rivers in Greece. The most celebrated of this name are those in Achaia and Bœotia.

Asp, a venomous snake. The name as applied in the Bible probably refers to the hooded, or African cobra (*Naja haje*), common in Egypt, and often represented in hieroglyphics. The *naja haje* is from three to five feet long, and the loose skin on its neck can be dilated into a hood, like that of the Indian cobra, but its markings differ. (See COBRA.) The asp employed for suicide by Cleopatra was probably the small-horned viper (*Aspis hasselquistii*). The asp of southern Europe is *Vipera aspis*, found from France to the Tyrol and in Italy. (See VIPER.)

Asparagin, **Asparagine**, a nitrogenous substance having the formula $C_4H_8N_2O_8$, or $CONH_2 \cdot CH_2 \cdot CH(NH_2) \cdot COOH$, occurring in the juice of most plants, and notably in the growing buds of asparagus. It is readily obtained by filtering the plant juice, and evaporating it to a syrupy consistency. The asparagin then separates in the form of trimetric prismatic crystals, which are soluble in water and in acids and alkalis, but insoluble in alcohol or ether. Asparagin undoubtedly plays a very important (though yet

ASPARAGUS

unknown) part in the chemistry of plants, since it occurs in large amounts in germinating seeds, and wherever growth is actively proceeding.

Aspar'agus, a genus of about 150 species of mostly tuberous-rooted, climbing, drooping, trailing, or erect perennial herbs or shrubs widely distributed in tropical and warm temperate countries, especially in southern Europe and southern Africa, but more or less cultivated for food or ornament in all civilized countries. Some species rival and even excel the most delicate ferns in beauty of habit and foliage, which botanically considered, consists not of leaves but leaf-like stems. The ornamental species with the exception of *A. verticellatus* (see below), must all be grown in green-houses, except in southern Florida and southern California, where they may be planted with safety out of doors. They are readily and usually propagated by seeds, but often also by cuttings and by division. Among the best-known ornamental species cultivated in America are the following: *A. medeoloides*, also known as *Myrsiphyllum asparagoides*, the smilax of the florist, is widely grown for decorative purposes, for which its glossy green leaves specially commend it. (For culture, see SMILAX.) *A. sprengeri*, a species recently introduced from Natal, with long drooping branches, glossy light-green leaves (white in one variety); small white fragrant flowers in small racemes and little red berries. It is very popular, especially for planting in hanging baskets. *A. plumosus*, a tall climbing species from South Africa with horizontal branches of beautiful form, texture and color, which qualities are retained for weeks or even months after cutting. Deservedly one of the most popular of decorative plants. It has developed several varieties, some of which, especially the variety *tenuissimus*, are even more popular than the original species. *A. verticellatus*, a hardy species with tufts of hair-like leaves and small red berries, is a native of Persia and Siberia, and climbs to a height of 12 to 15 feet from a woody root stock. The stout young shoots are said to be edible, but they quickly become woody and spiny, and are then unfit for the table. Several other species are cultivated for ornament in America.

Best and most widely known, however, is *A. officinalis*, esculent asparagus, which is also used to some extent as an ornamental plant. It is a perennial herb, native of Europe and Asia, and commonly found growing in sandy loam or sea shores, river banks, and among shrubby undergrowth. In a wild state it rarely exceeds a foot in height and a stem diameter of more than one third of an inch; but in gardens sprouts are sometimes obtained as thick as a man's wrist, and the plants often grow more than four feet tall. For more than 2,000 years it has been cultivated for its succulent young shoots, produced from the thick root stocks in spring. An excellent method of growing the plant may be epitomized as follows:

The land chosen for the bed should be a rich, friable and warm loam, preferably exposed to the south or east. Manure should be applied without stint before the plants are set, and the preparation of the soil should be deep and thorough. The plants may be home-grown or purchased. One-year-old plants, if sturdy, are

preferable to older ones. For home growing a separate nursery bed should be prepared, and the seed previously soaked 24 hours in order to hasten germination, when sown in early spring, about two inches apart and one inch deep, at which rate an ounce should be enough for 200 or more feet of drill. Some radish seed of a small early maturing variety should be sown in the same drill, so that the young radish plants, which quickly appear, may mark the position of the rows of the slower-appearing and less-conspicuous asparagus plants. As soon as the radishes are of edible size, or even before, if necessary, they should be pulled and the asparagus plants, then an inch or two tall, left in possession of the ground. Beyond keeping down weeds, destroying pests, and thinning the plants to four inches asunder, no further attention is necessary during the first year. In the spring of the second year, if properly managed during the first, the plants should be large enough to be transplanted to the permanent bed. If too small they should be transplanted at least eight inches asunder, and grown a second year in a nursery bed. In the permanent bed the plants should stand at least two feet asunder in rows not less than four feet apart. Five or even six feet for the larger growing varieties is much better. Staminate plants are more productive of shoots than pistillate, but are difficult to recognize until the plants flower. The furrows are plowed six inches deep or deeper, the plants set in the bottom, but at first covered with only about two inches of earth. After growth starts the trench is gradually filled by cultivation which must be thorough, both among the plants and between the rows. Not before the second spring after planting in permanent quarters should any shoots be gathered. At the time of planting a liberal dressing of some slowly decomposing fertilizer, such as ground bone, should be given in the drill, and in the spring of each year complete fertilizers should be applied liberally. (See FERTILIZERS.) In addition to such applications many growers spread stable manure upon the bed in the autumn after the tops have been removed, a necessary practice to prevent the scattering of the seeds upon the bed. In the spring as soon as the soil can be worked the land is either plowed shallow or cultivated deeply to bury the manure. Since the plants are gross feeders there need be little fear of fertilizing too heavily. Methods of gathering depend somewhat upon whether the stalks are to be blanched or left green. Blanching is done by ridging the soil 13 inches deep above the crowns. Stalks so produced are gathered as soon as the tips appear above the soil; green stalks are cut when about nine inches long, including the base of two or more inches below the surface of the ground. In each case the stalk may be cut with an asparagus knife or preferably snapped near the crown, or at least at the proper depth, if blanched, by plunging the hand down in the loose soil beside the stalk and severing it with the fingers. By the latter method there is less danger of injuring other shoots. All cutting should cease when green peas, grown in the same locality, are ready for the table, because the plants must be given opportunity to store up food for the following year. The stems are usually sold in bunches of various sizes, the grade depending upon the length and

ASPARAGUS-STONE; ASPASIA

number of stalks in the bunch. The bunch commonly sold is eight and one half inches long, weighs about two pounds, and contains 30 spears. As a rule, the thicker the spear the better. First class spears are three quarters of an inch thick or thicker. Every care must be taken in handling to prevent bruising, since a gummy juice collects in the broken cells, and the injured stalks spoil by heating. After washing, the stalks should be dried and kept cool. If to be shipped long distances, their butts should rest in damp sphagnum moss or similar material. In the home garden, where horse cultivation is not practicable, the plants may be set even as close as 18 inches by two feet, but the manuring, cultivation and other care must be increased in order to obtain choice shoots. Each spring the very liberal dressing of manure applied the previous autumn should be forked, not dug, in, and a lavish amount of commercial fertilizer, rich in potash, phosphoric acid, and nitrogen, applied. Soap suds may be emptied upon the bed; they have more or less potash in them. Asparagus sometimes is forced in hot beds, under greenhouse benches, in cellars, etc., by setting mature crowns (plants) close together and supplying heat and moisture. A large amount of light is not essential. It is also forced in the field by covering the beds with cloth and applying heat by means of portable steam pipes, either in or upon the ground. In the former case the roots are ruined by the process; in the latter, they are not, but should be given one or more years to fully recuperate. (See reports and bulletins of Cornell Experiment Station and of Missouri Experiment Station). Several other species furnish edible shoots; for example, *A. acutifolius*, *A. albus* and *A. tennuifolius*, all European species. The tubers of *A. lucidus* are eaten in China and Japan, where the species is indigenous. The shoots of *A. scaber*, which resemble those of *A. officinalis*, are inedible because bitter.

Enemies.—Asparagus has only two important enemies, and when compared with other general crops, long cultivated, only a few less serious ones. Asparagus rust (*Puccinia asparagi*) has been known for about 100 years, but only during the last decade of the 19th century did it do serious damage. In a badly infested field the plants as a whole seem to be maturing very early, their deep green having been replaced by a tawny brown. The stems examined closely, show a blistered and ruptured skin, beneath which are brown masses of spores or in late autumn, almost black winter spores. In the spring the "cluster cup" is the form observed. The most effective control is the resin-Bordeaux mixture, made by adding to each 48 gallons of standard Bordeaux mixture two gallons of resin stock solution, made as follows: Heat five pounds of resin and one pint of fish-oil in a kettle until the resin is dissolved. If very hot, allow to cool somewhat. Then slowly stir in one pound of potash lye and heat again till the mixture becomes the color of amber, when five gallons of water must be added. If the potash be added while the resin is too hot, the mixture may ignite. This solution increases the adhesiveness of Bordeaux mixture. (See FUNGICIDE.) With the mixture 50 per cent greater yield has been obtained in unfavorable seasons, and 70 per cent in favorable. Growers

cutting 800 bunches or more per acre find that thorough spraying each week for four, five or even more weeks pays well. For detailed account of this disease and specific methods of control, see New York Experiment Station Report (1901). The asparagus beetle (*Crioceris asparagi*), a European insect introduced about 1856, the only seriously injurious insect pest, is about one quarter of an inch long with black and yellow or red wing-covers. It belongs to the *Chrysomelida*. It appears as the adult in spring, and lays eggs on the shoots. In a few days grayish-green grubs appear and gnaw the green parts of the plants. When full grown they burrow in the ground to pupate for a short time. The broods succeed each other at intervals of about a month, if the weather be favorable. Their natural enemies are lady-bird beetles and soldier beetles. The popular remedies are the corralling of chickens, ducks, and turkeys in the plantation; cutting all volunteer plants in waste places; cutting new shoots daily; allowing spindling shoots to remain in alternate rows for the insects to deposit their eggs upon and burning the shoots not less often than once a week; dusting with air-slaked lime or road dust while the dew is on; brushing the grubs to the hot ground from the full grown plants, the middle of the day being chosen for this operation; spraying with arsenites, hellebore or other stomach poisons; etc. A case of fight early and fight late! The 12-spotted asparagus beetle (*Crioceris 12-punctatus*), about the same size as its relative just described, but orange red with black dots, has a similar life history, and may be controlled in the same way but is not yet seriously troublesome, except in a few localities. Several plant bugs, moth larvæ, beetles and aphids also feed upon asparagus, but have not become serious pests. Consult: Year-book United States Department of Agriculture (Washington, 1896), and Bulletin No. 10 (1898). See INSECTICIDES.

For fuller details of asparagus culture consult: Hexamer, 'Asparagus Culture' (1901); Bailey and Miller, 'Cyclopedia of American Horticulture' (1900-02). In the latter will also be found specific instruction for the cultivation of ornamental asparagus.

Asparagus-stone, a variety of apatite, found in Murcia, Spain, in the form of small, transparent, yellowish-green crystals.

Aspasia, às-pā'shī-a, a celebrated woman of ancient Greece: b. in Miletus in Ionia, but spending a great part of her life in Athens. Her house was the general resort of the most virtuous, learned, and distinguished men in Greece. She inspired the strongest and most enduring affection in the heart of Pericles, who had separated from his own wife and united himself to Aspasia as closely as was permitted by the Athenian law, which declared marriage with a foreign woman illegal. When the Athenians were dissatisfied with Pericles, instead of attacking him they persecuted the objects of his particular favor, and accused Aspasia of contempt of the gods. Pericles defended her in the Areopagus, but it required all his influence to procure her acquittal. After his death (B.C. 429) Aspasia is said to have attached herself to a wealthy but obscure cattle-dealer, of the name of Lysicles, whom she soon made, however, an influential

ASPECT — ASPHALT

citizen in Athens. She had a son by Pericles, who was legitimated by a special decree of the people.

Aspect, a term in astronomy and astrology, denoting the situation of the planets and stars with respect to each other. There are five different aspects: (1) sextile aspect, when the planets or stars are 60° distant, and marked thus, *; (2) the quartile or quadrature, when they are 90° distant, marked \square ; (3) trine, when 120° distant, marked \triangle ; (4) opposition, when 180° distant, marked \oslash ; and (5) conjunction, when both are in the same degree, marked \odot . Kepler added eight more. It is to be observed that these aspects, being first introduced by astrologers, were distinguished into *benign*, *malignant*, and *indifferent*; and Kepler's definition of aspect, in consequence, is "Aspect is the angle formed by the rays of two stars meeting on the earth, whereby their good or bad influence is measured." The only aspects now in use are conjunction and opposition.

Aspen, Col., a city and county-seat of Pitkin County, on the Roaring Fork of Grand River, and the Atchison, T. & S. F., and the Denver & R. G. R.R.'s; 30 miles west of Leadville. It was incorporated in 1883; and has since become the centre of one of the richest mining sections in the country. In the city and vicinity are more than 20 mines, for which there are a number of gold, silver, copper, and lead ore mills. While the smelting and concentrating of ores is the distinctive industry, the city has several minor factories, and it is also the principal mining trade centre of the Roaring Fork valley. Pop. (1900) 3,303.

Aspen, tremulous poplar, an open-headed tree, of the natural order *Salicaceæ*, native of the cooler parts of Europe and Asia, and succeeding best upon moist, gravelly soils. It grows quickly; usually attains a height of 50 to 60 feet, sometimes even 100 feet; has light, small, thin-toothed leaf-blades upon long, slender, flattened petioles which permit the blade to flutter with the least breeze, hence the specific name *tremula*, tremulous. The wood being white, light, soft, and porous, is not a valuable fuel, but is useful for making charcoal for the manufacture of gunpowder, and for turning, often being employed for making bowls, trays, troughs, and pails. The wood may be made harder and thus rendered useful for interior work in houses by peeling off the bark and allowing the stem to dry before felling it. In places where this tree abounds, and other timber is scarce or expensive, this method of hardening is very useful. The bark is rich in a glucoside called salicin and used in leather tanning. In the United States the tree is best known as an ornamental one, its variety, *pendula*, with graceful drooping sprays, being perhaps the best weeping poplar. The male plants are preferred because of the abundance of their catkins which appear in early spring before the catkins of American species blossom. The American aspen (*Populus tremuloides*), very generally distributed from Alaska to Labrador and southward to Pennsylvania and California, and, in the mountains to Mexico, so closely resembles the preceding species that many botanists consider it merely a variety. Its light-gray

branches render it conspicuous in clearings where it is one of the first trees to appear. It is said to attain a height of 100 feet when grown in the forest. This tree, like the following, is widely used in the manufacture of wood pulp. The large-toothed aspen (*Populus grandidentata*) is a large American species found from Nova Scotia to Minnesota and southward to Tennessee. It is a tall tree, often reaching 75 feet, and has bluish or rusty-white leaves thicker and larger and with more spreading teeth than the former two species. Except its drooping varieties, it is rarely used as an ornamental tree. See POPLAR.

Aspern, as-pern, and **Esslingen**, two villages a few miles east of Vienna, on the opposite bank of the Danube, celebrated for the battle fought 21 and 22 May 1809, between the Archduke Charles and Napoleon I. After the fall of the capital the Austrian general resolved to suffer a part of the enemy's forces to pass the Danube, and then to surround them with his own army and drive them if possible into the river. Everything depended on the possession of these two villages: Aspern was at first taken by the Austrians, again lost and retaken, till they at length remained masters of it: from Esslingen they were continually repulsed. The battle was renewed on the 22d; the French army being now increased so as at least to equal the Austrians in number. Thousands of lives were sacrificed in vain attempts to capture the villages. Aspern continued to be the stronghold of the Austrians and Esslingen of the French. When the army of Napoleon gave up all hopes of gaining the victory by forcing the centre of the Austrians, Esslingen served to secure their retreat to the island of Lobau. The loss of the Austrians in killed, wounded, etc., was estimated at less than a third of the whole army; that of the French at half. The latter lost on this occasion Marshal Lannes. The Austrians had 4,000 men killed and 16,000 wounded, the French 8,000, 30,000 wounded. By the French the engagement is known as the battle of Essling or Esslingen, but the Austrians style it the battle of Aspern.

Asphalt. The general term asphalt is applied to the several varieties of hydrocarbons of an asphaltic base which exist in all conditions from the liquid to the solid state. It is more specifically employed to include the purer forms of hard and soft bitumen, such as elaterite, albertite, gilsonite, nigrite, wurtzilite, brea, etc. The term bituminous rock includes sandstones and limestones impregnated with bitumen or asphalt. This rock, usually shipped without previous refining, is used principally for street pavements and is mixed with other ingredients at the place of use.

The importation of asphalt into the United States is chiefly from the Island of Trinidad, off the coast of Venezuela. Other imports are made from Bermudez and Venezuela. Bituminous limestones are imported from Neuchâtel and Val de Travers, in Switzerland, from Seyssel in France, and in small quantities from Germany, Italy, Russia, Austria-Hungary, Spain, Turkey in Asia, Great Britain, the United States of Colombia, Canada, the Netherlands, Cuba, and Mexico. The total imports from Trinidad and Venezuela in 1900 amounted to 134,189 long tons, and at the present time the value of our

ASPHALT

domestic product is about equal to that of the imported asphalt, at the point of shipment. The Island of Trinidad, one of the British West Indian possessions, is, next to France, the largest producer of asphalt in the world. The deposits are operated by an American corporation under a concession from the British government, and, also, independently, from land not belonging to the crown, acquired by purchase. The chief source of supply is a lake of pitch filling the crater of an extinct volcano. This lake lies 138 feet above sea-level, and has an area of about 114 acres. The supply is partly renewed by a constant flow of soft pitch into the centre of the lake from subterranean sources. The shipments of this lake pitch average over 80,000 tons per year, and the flow into the lake is at the rate of about 20,000 tons per year. The depth of this lake is about 135 feet at the centre. Distinct from the lake pitch is what is known as "land pitch," the overflow in past times of pitch from the lake, and deposits of similar nature. During recent years strenuous efforts have been made to discredit all asphalt mined from properties located outside of Pitch Lake. These efforts seem to have failed, however. Careful analyses of samples of asphalt taken from different parts of Pitch Lake, from deposits outside the lake and from the district of La Brea show that these asphalts are so similar in composition that for practical purposes they may be considered as identical in quality. The samples have a common origin, for the presence of mineral matter in these asphalts cannot be regarded as adventitious, since it is thoroughly incorporated with the bitumen in the same proportion and has the same percentage of composition, as regards the relative proportions of matter soluble in water, in acids and insoluble substances. There is no doubt that the pitch found in the deposits outside the lake has been divided from the lake itself by the subterranean flow of pitch to the viscous condition, a condition rarely assumed under the combined influence of heat and pressure. It is true there is a difference in the crude materials in these asphalts; one is softer than the other, because of containing more volatile oils. Nature simply began on the asphalt outside the lake; it being more exposed to the rays of the tropical sun, the process of refining it drove those volatile oils off, a necessary accomplishment to make the material fit for paving purposes. It would appear, therefore, that a part of the labor of refining has been done on the land or overflow asphalt which remains to be done with the lake asphalt.

In 1875 the asphalt paving industry was in its infancy in the United States. In 1903 there were about 42,000,000 square yards of asphalt, sheet and block, which has been laid at a cost of about \$110,000,000. These pavements are frequently called bituminous pavements, inasmuch as bitumen is the largest constituent of the asphalt, frequently running as high as 9 per cent. Asphalt is manufactured into a cement by mixing it with other forms of bitumen, and this cement is in turn used to bind together particles of sand and limestone in the asphalt pavement. No two asphalts are alike. The life of the pavement depends upon the crude bitumen used, the skill in its manufacture into bituminous cement, the proper proportioning and mixing of the cement with the sand and dust and in the selection of the mineral aggregate.

In 1870, Prof. E. J. Smedt, a Belgian chemist, laid the first sheet asphalt pavement in this country, in Newark, N. J. Prior to this date, coal tar had been used as the cementing material, but with little satisfaction. In 1876 Congress appointed a commission, consisting of Gens. Horatio G. Wright and Quincey A. Gilmore, of the corps of engineers, and Edward Clark, architect of the capitol, to select the best pavement for Pennsylvania Avenue in Washington. Forty-one proposals, for stone, macadam, tar and asphalt pavements, were received. The commission selected two, and decided to use Neuchatel rock asphalt, and De Smedt's artificial Trinidad mixture, in the proportion of two to three. The artificial Trinidad mixture has been most satisfactory. When it was decided, in 1889, to repave Pennsylvania Avenue in Washington, the entire avenue was relaid with it, and the Neuchatel was discarded.

Trinidad Pitch Lake has furnished over 85 per cent of the asphalt used in the United States. The liquid asphalt passing through clay saturates it or carries it in suspension and becomes a brown, earthy, non-viscous substance, chemically composed as follows:

Bitumen	47 per cent
Infusorial earth	28 per cent
Water	25 per cent

The water is evaporated in refining and the residue (approximately one third clay and two thirds hard asphalt) regains some of its viscosity and requires the admixture of some flux or softening agent to give it the proper consistency for paving operations. Samples taken at 100 and 150 feet deep at the centre of Pitch Lake do not differ in composition from those taken on the surface near the shore, showing the homogeneousness of the entire mass. The surface is in constant motion, and gradually lowers as the asphalt is removed. Refined asphalt is shipped from Trinidad to Mexico, South America and other foreign countries; but, owing to the very high duty on refined asphalt coming into the United States, it is cheaper to refine here.

In 1892, the New York and Bermudez Company began the importation of a very pure and hard asphalt from a deposit in the State of Bermudez, Venezuela, and up to the present time about 3,000,000 square yards of pavement have been laid with this material. The Bermudez Asphalt Lake, covering an area of about 1,000 acres, lies about 20 miles from the Gulf of Paria, in a straight line. There are many springs of soft asphalt or maltha, the largest being about 7 acres in area. Outside of the springs, where new material is constantly exuding, the surface of the lake is covered with vegetation and trees, which must first be cut off to reach the asphalt. The quality of the asphalt varies from maltha or liquid asphalt exuding from the springs, to a hard glance pitch. The crude Bermudez asphalt contains on an average about 31 per cent of water, which is present as a mixture and not as an emulsion, and about 66 per cent of bitumen. This asphalt is softer and more brittle than Trinidad, but possesses all essential cementitious qualities.

As early as 1879 asphalt found in Southern California was laid at an intersection on Market Street, San Francisco, which is the heaviest traveled street in that city. In 1884 the late Jesse Warren reported on these California

ASPHALT PAINTING — ASPIDIUM

asphalts, the only indications of which were slight surface exudations of liquid asphalt and large banks of bituminous sandstone (sand saturated with asphalt). In 1895, the Alcatraz Company successfully laid two streets in New York city and acquired a high standing for the California product which was subsequently controlled by the Asphalt Company of America. It has been laid in many Eastern cities, under the trade name of "Alcatraz," "Standard," "Ventura," etc., and has been uniformly successful when refined, mixed and laid intelligently, by men experienced in handling asphalt in all its stages. Shortly after the organization of the Asphalt Company of America, beds of very pure, high grade, liquid asphalt were discovered in Southern California. This being a nearly pure, viscous bitumen, it does not require a softening agent or flux, nor the admixture of other bituminous material, to make it of the proper consistency for paving.

Asphalt Painting. Asphalt was once largely used in painting, especially in the old Dutch school. It was dissolved in spirits of wine to ensure greater permanence. Because of its unreliability it ceased to be used.

Asphalt Process, a photographic process devised about 1814 by J. N. Niepce (q.v.). He coated a plate of polished metal with asphalt varnish, and then placed it with a drawing in a camera obscura for from 4 to 6 hours. The parts of the asphalt which had been acted upon by the light became insoluble. The parts of the asphalt film that had been protected were dissolved by essential oils, and thus a copy of the drawing was brought out. The "heliographs" thus made were not particularly successful. This method has been modified in the asphalt process of photo-mechanical printing. See PHOTO-ENGRAVING.

Asphaltic Coal, coal-like substances which though they have sometimes been classified as coals, differ from all the true coals in respect to both their geological position and their composition. They do not occur in strata, but occupy cavities and fissures, into which they appear to have flowed when plastic. They have been found in Devonian, Carboniferous, and Tertiary rock. The regions in which they are principally mined are Albert County, New Brunswick (albertite), the Uinta Mountains, Utah (gibsonite and uintahite), and Colorado, West Virginia, Texas, and Mexico (grahamite). Wurtzilite is found also in Utah. Their chief uses are as a basis for varnishes, and as insulators. Consult: Blake, 'Uintahite, Albertite, etc.'; 'Transactions' of the American Institute of Mining Engineers, Vol. XVIII. (1890).

Asphodel, a small genus, *Asphodelus*, of hardy annual and perennial fleshy-rooted herbs, natives of the Mediterranean region, belonging to the natural order *Liliaceæ*, but by some botanists made the type genus of the natural order *Asphodelæ*. *A. luteus*, *lutea*, king's spear, or yellow asphodel, the true asphodel of the ancients, attains a height of two to four feet, has numerous long (3 to 12 inches) narrow rough-margined leaves which embrace the stem, and in early summer yellow flowers in long racemes (6 to 18 inches), and large persistent membranous bracts. *A. albus*, branching or white asphodel, which has radical leaves, blossoms about

the same time as the preceding species, and produces its white funnel-shaped blossoms in branched clusters. Both species are readily propagated by division and are of easy cultivation in any soil. They thrive fairly well in partial shade, but do better when more or less exposed to the sun. *A. ramosus*, a species which by some botanists is made to include *A. albus* and many other species, is cultivated in Algeria and some other countries for its starchy roots which are used to make alcohol. The refuse from this manufacture, together with the leaves and stems, is employed in paper and cardboard-making. Several other related plants are often called asphodel, among which are *Narthectum ossifragum*, bog asphodel, common on European moors; *N. americanum*, by some botanists considered a form of the preceding, and *A. californicum*, similarly called in America. False asphodel is a name given to several species of *Tolstedia*. The asphodel of the poets is *Narcissus pseudo-narcissus*.

Asphyxia, etymologically, pulselessness, but literally a condition of partial or complete loss of consciousness because of defective oxidation of the blood. The symptoms may be developed rapidly or slowly. In sudden occlusion of the air passages, such as caused by a foreign body in the larynx, or compression of the throat as in hanging, there is usually a quiet period of from 20 to 30 seconds after which respiratory movements, both of inspiration and of expiration, follow. These gradually increase in frequency and depth until in about a minute powerful expiratory convulsions occur; convulsive movements of inspiration are also produced, but these are usually milder in character. A period of exhaustion sets in, the respiratory movements become slower and more irregular, and gradually cease. During this period the face has become pallid, and then deeply cyanosed and flushed, the lips blue to purple, and the body temperature, at first increased, gradually diminishes. The blood pressure is at first increased, and then falls gradually to zero. Unconsciousness develops about a minute after the occlusion, although there is great individual variation, the sphincters relax and the urine and feces are passed. There is a loss of muscle-tone, and the reflexes are abolished. In asphyxia both lack of oxygen and increase of carbonic-acid gas in the blood are important factors. Asphyxia may result from an excess of carbonic-acid gas with a normal amount of oxygen, and may be produced, if the amount of oxygen is diminished one half, with no variation of the carbon dioxide. For treatment, see DROWNING.

As'pic, a dish consisting of a clear, savory meat jelly, containing fowl, game, fish, etc

Aspid'ium, a widely distributed genus of ferns, numbering upward of 500 species, of which more than a dozen are found in the United States, including the male and shield ferns. Their only economic use is in medicine. The active principles in this and allied species are filicic acid, aspidin and other phloroglucin-like bodies. The action is largely on the tape-worm, for which parasite this drug is given. Poisonous symptoms sometimes are produced. These are pain, muscular weakness, purging, collapse, and even death. Temporary blindness has been produced by male fern.

ASPINWALL — ASS

As'pinwall, William, an American physician: b. Brookline, Mass., 23 May 1743; d. 16 April 1823. He studied medicine in Philadelphia, and practised in his native town. He served as surgeon with the Revolutionary army, and later became interested in the subject of vaccination and established that preventive in American practice.

As'pinwall, William H., an American constructor of railroads: b. New York city, 16 Dec. 1807; d. 18 Jan. 1875. He was for many years a partner in a large shipping firm in New York, but retiring from it in 1850, turned his attention to building the Panama Railroad, whose eastern terminus of Aspinwall is named in his honor. He was likewise prominent in forming the Pacific Mail Steamship Company.

As'pinwall, or Colon, the Atlantic terminus of the Panama Railroad; a South American seaport in the Republic of Panama. It is situated on the small island Manzanilla, in Navy or Limon Bay, which forms its harbor. It was founded in 1850 by the Panama Railroad Company. Its population varies with the work on the Panama Canal.

As'pirate, in grammar, an accent peculiar to the Greek, marked thus (´), and importing that the letter beneath ought to be strongly aspirated, that is, pronounced as if an *h* were prefixed.

As'pira'tor, an apparatus employed to promote the flow of a gas from one vessel into another by means of a liquid. Its simplest form is a cylindrical vessel with a pipe at the upper end communicating with the vessel containing the gas, and a pipe at the lower end also, with a stopcock, and with its extremity bent up. By allowing a portion of the water to run off by the pipe at the lower part of the aspirator a measured quantity of air or other gas is sucked into the upper part.

Aspiroz, as-pē-rōth, **Manuel de**, a Mexican statesman and diplomatist: b. Puebla, 1836. He was Mexican consul at San Francisco 1873-5, law professor in the College of Puebla, 1883-90, and was appointed secretary for foreign affairs in the year last named. In 1899 he succeeded Señor Romero as ambassador to the United States. He has published 'Código de extranjería de los Estados Unidos Mexicanos' (1876); and 'La libertad civil como base del derecho internacional privado' (1896).

Asple'nium, a genus of about 200 species of small ferns of world-wide distribution, belonging to the sub-order *Polypodiaceæ*, characterized by free veins and elongated sori covered by an indusium. Many of the species are very beautiful and are consequently favorites with cultivators whose space is limited. *A. viride*, *A. adiantum-nigrum*, *A. trichomanes*, and other species are commonly called spleenwort from their formerly supposed efficacy in internal medicine. The two last-mentioned species also bear the name of maiden-hair, but are not the true maiden-hair fern (*Adiantum*). In the eastern United States a dozen or more species are to be found growing wild, among which the more common are *A. thelypteroides*, *A. angustifolium*, and *A. felix famia*, which reach a height of from one to four feet. In cultivation, slight shade is almost essential, as is also abundant water at the roots, but the air must not be very

moist else the leaves will turn brown. The plants thrive in light friable peaty soil. Species of this genus have been identified in rocks of Middle Jurassic time, thus indicating the antiquity of the group.

Aspromon'te, as'promōn'ta, a mountain of Italy, near where Garibaldi was wounded and taken prisoner with the greater part of his army, in August 1862.

As'quith, Herbert Henry, an English statesman: b. Morley, Yorkshire, 12 Sept. 1852, and educated at Balliol College, Oxford. He studied law and was admitted to the bar of Lincoln's Inn in 1852. He entered Parliament in 1886 as member for East Fife, and was re-elected in 1892 and in 1895, and was home secretary in Gladstone's last cabinet. He was conspicuous as a debater during the Home Rule discussions, and in 1894 drew up the Welsh Church Disestablishment Bill. Although prominent as a Liberal he stated publicly, in 1901, that his branch of the Liberal party favored the Boer war.

As'rael, or **Azrael**, in the Mohammedan mythology, the angel of death

Ass (As. *assa*, Goth. *asilus*, Rus. *osclu*, Lat. *asinus*, probably of Eastern origin; cf. Heb. *āthōn*, she-ass) or, when domesticated, *Donkey*. A member of the family *Equidæ* and usually placed in the genus *Equus*, with the horse, though sometimes made the type of a separate genus, *Asinus*. There are at least three species, one Asiatic, and the others African. From the North African species the domesticated ass or donkey has probably descended, although many of its characteristics, particularly its spirit and bearing, are greatly altered. In size, in the short hair and terminal tuft of the tail, and in the fact that only the fore-legs present callosities, the ass resembles the zebra rather than the horse; and although not striped like the zebra, it has a varying tendency to stripes on the legs. The Asiatic ass (*Equus hemionus*) is divided into three local varieties, of which the one found in Persia and Syria must be that which the Old Testament writers used as a type of unhampered wildness. Of the others, the kiang, koulán, or dziggetai of Thibet, is the largest and most strikingly colored. Its height is sometimes four feet at the shoulders. Like all asses, it is pale underneath, but the color above is a dark red with a narrow black stripe along the mane and backbone from head to tail. The third variety, the onager or ghorkhar, like the first, is smaller and paler; sometimes it is even silvery, and its dorsal stripe is broader in proportion than that of the Thibetan ass. It inhabits the plains of northwestern India, Afghanistan, and Beluchistan. Unlike the donkey, these wild asses are so extremely swift, enduring, and agile that on the plains they cannot be overtaken by a single horseman. In the mountains they are less shy, and sometimes voluntarily approach travelers. Wild asses are hunted for sport, and it is said of their flesh, that, while resembling venison, it has an even finer quality. The asses of the plains migrate to the hills in summer when the plains are dry. See KIANG; ONAGER.

The African ass (*Equus Africanus*) differs widely from the Asiatic, being larger and having a bluish tint rather than a tendency to red.

It is sometimes as much as 14 hands high, and has the very large ears which characterize the donkey. The dark stripe on the back begins only at the shoulder, but extends from the tail down the withers; the hair of the mane and tail is short, and varies little from that of the body in color. It is found in all the open regions of northeastern Africa, and westward through the Sahara and Sudan. Like the Asiatic ass, it is extremely wild and fleet. A second species of African wild ass (*Equus somalicus*) was found in Somaliland a few years ago (see Proc. Zool. Soc. of London, 1884, p. 540), which is distinguished by its grayer color, and faintness of its stripes; it also has smaller ears and a more flowing mane. Living examples have been kept in London.

The leading authorities on these animals are Blanford and Tegetmeier, the latter the author of 'Horses, Asses, and Zebras' (1895).

The donkey, or domestic ass, was probably first tamed in Egypt, where it was known before the horse, and has always been much used; some of the Eastern breeds of the donkey are far larger and finer than those commonly seen in Europe, though in Spain and Italy, where they are more used, they are superior to those of other European countries. In England they are little employed, but in America are kept by stock raisers in the Middle and Southern States for the breeding of mules and hinnies. (See MULE) Their milk is recommended in cases of consumption and dyspepsia, and their skins furnish the leather called shagreen, besides an excellent shoe-leather and the covering of drums.

Ass, Feast of the, a mock ceremony observed in northern France in the Middle Ages. It was originally a good-natured parody on the church service without intentional irreverence, but degenerated into an indecent performance. It was in substance a brief farce in which Balaam's ass appeared before the church altar to prophesy the coming of Christ.

Assab, as-sab', an Italian trading station on the coast of the Red Sea, 40 miles from the Strait of Bab-el-Mandeb. The neighboring district with an area of 243 square miles, was sold in 1870 by some Danakil chieftains to an Italian steamship company for a coaling station on the road to India. In 1880 it was taken over by the Italian government, which, since 1884, has improved the harbor and erected a lighthouse.

Assai, as-si', a food made from the fruit pulp of various species of Brazilian palms closely allied to the cabbage palm (q.v.) and largely used in the lower Amazon region. The principal species are *Euterpe edulis* and *E. Catinga*. The first species grows in tide-flooded swamps, where it may attain a height of 90 feet with a diameter of only four or five inches. It produces upon branched spadices an abundance of small pea-like purple fruit with a thin firm pulp and a hard seed. These fruits are kneaded in warm water to produce the thick purplish assai which is generally eaten with starchy foods. The terminal bud of this species is eaten like that of its close relative, *E. oleracea*, the cabbage palm, and its stems are used as rafters and poles. The other species grow on dry, sandy, upland soils, its smaller quantity of fruit furnishing a sweeter assai.

Assal, as-sal', a large salt lake in the district of Adal, in eastern Africa, near the coast of the Bay of Tajura. It is nearly 600 feet below the level of the sea. Abyssinian caravans resort to Assal for the purpose of carrying off the salt, thickly encrusted on its shores.

Assam', a chief-commissionership of British India, situated mainly between Upper Burma and the Himalayas, with an area of 52,078 square miles. It may be considered as a long series of fertile valleys watered by the Brahmaputra and its tributaries. The valley of the Brahmaputra consists of rich alluvial plains, either but little elevated above the flood-level of the Brahmaputra and its feeders, or so low that large extents of them are flooded for three or four days once or twice in the year. The Surma valley is even more subjected to inundations than the plains of the Brahmaputra, but the Surma and its tributaries having more permanent banks, the shifting is trifling compared with the banks of the Brahmaputra. In Assam are found the valuable teak and sissoo trees, date, and sago palms, the areca palm (the betel-nut-tree), the Indian fig tree, etc. But the article of most commercial importance grown in Assam is tea. The plant was discovered growing in this region in 1823, but not till 1838 did the first shipment reach England. The plant producing it, though not regarded as specifically distinct from that of China, is much larger and more vigorous. There are now about 300,000 acres under tea; the yield is about 100,000,000 pounds annually. Rice covers a large extent of the cultivated soil, occupying about 1,500,000 acres. The other crops include maize, pulse, oil-seeds, sugar-cane, hemp, jute, potatoes, etc. In the jungles and forests roam herds of elephants, in the dense and swampy parts of the forests the rhinoceros is met with, and tigers and wild buffaloes abound; leopards, bears, and wild hogs are numerous, and among other animals are jackals and foxes, goats, deer, and the venomous cobra. Coal, petroleum, limestone, and iron are found, and gold-dust is met with in many of the rivers. The coal-beds are supposed to be co-extensive with the main valley, but coal is only worked to the south of the Brahmaputra. The inhabitants are mostly engaged in agriculture. There is no Assamese nation proper, various ethnical groups being represented. The people seem to be contented, good-natured, and indolent, and have few wants beyond what can be easily supplied from their fertile fields, for which they pay but a very small rental. Great respect is paid to the aged; parents, when no longer able to work, are supported by their offspring; they are tenderly attached to their children, kind to their relatives, and hospitable to people of their own caste. Assam, known in ancient Indian history as Kāmarūpa, formed in the 7th century A.D. a powerful independent kingdom under a Brahman sovereign, but in the 15th century it broke up into 12 separate states, which, in spite of their numerous internal struggles, were generally able to resist the attacks of the powerful Mogul emperors. Late in the 18th century its condition encouraged the Burmese to make the country a dependency of Ava, but the Burmese encroachments on the territory of the East India Company brought about war with the British. In 1826 Assam became a possession of Great

ASSAS — ASSAULT

Britain under the administration of the lieutenant-governor of Bengal, and in 1874 was erected into a chief-commissionership. There are no towns properly so-called, but some large villages. The seat of administration is Shillong. Pop. (1901) 6,122,201.

Assas, äs'sä, **Nicolas, Chevalier d'**, a French officer, celebrated for an act of patriotism which cost him his life. He was captain in the regiment of Auvergne when the French army was stationed near Gueldres, in 1760, and on 15 October, while engaged in reconnoitering, was taken prisoner by a division of the enemy advancing to surprise the French camp, and threatened with death if a word escaped him. He shouted, "*A moi, Auvergne, voilà les ennemis!*" and was instantly struck down. An annual pension was allowed to his descendants.

Assas'sina'tion, a term denoting the murder of any one by surprise or treachery. It is commonly applied to the murder of a public personage by one who aims solely at the death of his victim. In ancient times, assassination was often even applauded, as in the Scriptural instances of Ehud and Jael, and in the murder of Hipparchus by Harmodius and Aristogeiton; but assassination by enthusiasts and men devoted to an idea first became prominent in the religious struggles of the 16th and 17th centuries. To this class belong the plots against the life of Queen Elizabeth; while the succession of assassinations of Roman emperors is but a series of murders prompted by self-interest or revenge. Omitting these last, the following list includes the most important assassinations, arranged in chronological order. Fuller accounts of the persons mentioned will be found under their particular headings:

Philp of Macedon.....	B.C.	366
Julius Cæsar.....	Mar. 15	B.C. 44
Thomas Becket.....	Dec. 29,	A.D. 1170
Albert I. Emperor of Germany.....	May	1, 1308
James I. of Scotland.....	Feb.	21, 1437
Alessandro de Medicis.....	Jan.	5, 1537
Cardinal Beaton.....	May	29, 1546
David Riccio.....	Mar.	9, 1566
Lord Darnley.....	Feb.	10, 1567
James, Earl of Murray, Regent.....	Jan.	23, 1570
William of Orange.....	July	10, 1584
Henry III. of France.....	Aug.	1-2, 1589
Henry IV. of France.....	May	14, 1610
Villiers, Duke of Buckingham.....	Aug.	23, 1628
Wallenstein.....	Feb.	25, 1634
Archbishop Sharp.....	May	3, 1679
Gustavus III. of Sweden, Mar. 16; d.....	Mar.	29, 1792
Marat, by Charlotte Corday.....	July	13, 1793
Gen. Kleber at Cairo.....	June	14, 1800
Paul, Czar of Russia.....	Mar.	24, 1891
Spencer Perceval, premier.....	May	11, 1812
Kotzebue, the dramatist.....	Mar.	23, 1819
Duc de Berri.....	Feb.	13, 1820
Charles III., Duke of Parma, Mar. 26; d.....	Mar.	27, 1854
President Abraham Lincoln, April 14; d.....	April	15, 1865
Michael, Prince of Servia.....	June	10, 1868
Marshal Prim, Dec. 28; d.....	Dec.	30, 1870
Georges Darboy, Archbishop of Paris.....	May	24, 1871
Earl of Mayo, governor-general of India.....	Feb.	8, 1872
Sultan Abdul-Aziz.....	June	4, 1876
Alexander II., Czar of Russia.....	Mar.	13, 1881
President James A. Garfield, July 2; d.....	Sept	19, 1881
Lord Frederick Cavendish and T. H. Burke in Phoenix Row, Dublin.....	May	6, 1882
President Sadi Carnot, France.....	June	24, 1894
Ex-Premier Stefan Stambuloff, Bulgaria, July 15; d.....	July	18, 1895
Premier Canovas del Castillo, Spain.....	April	22, 1897
President Juan Idiarte, Uruguay.....	Aug.	25, 1897
Empress Elizabeth of Austria, in Geneva.....	Sept.	10, 1898
President Ulisses Heureaux, Santo Domin- go.....	July	26, 1899
King Humbert of Italy.....	July	29, 1900
President McKinley, Sept. 6; d.....	Sept.	14, 1901
Alexander of Servia.....	June	11, 1903

Many attempts at assassination have been unsuccessful. Among those within the last century may be named: Against Alexander III. of Russia, repeatedly; Alfonso XII. of Spain, 1878 and 1879; Amadeus of Spain, 1872; Duc d'Aumale, 1841; Prince Bismarck, 1866 and 1874; Francis Joseph of Austria, 1853; George III. of England, 1786 and 1800; George IV. (when Regent), 1817; Humbert I. of Italy, 1878 and 1897; Isabella II. of Spain, 1847, 1852, and 1856; Louis Philippe, six attempts, from 1835 to 1846; Lord Lytton, viceroy of India, 1878; Napoleon I., by infernal machine, 1800; Napoleon III., twice in 1855, and Orsini's attempt in 1858; Queen Victoria, 10 June 1840, 30 May 1842, 3 July 1842, 19 May 1849, and 2 March 1882; William I. of Germany, 1861, 1875, and twice in 1878; President Diaz of Mexico and President Morales of Brazil, both in 1897; and the Prince of Wales in 1900.

Assas'sins, a term applied to a secret order of religious fanatics who flourished in the 11th and 12th centuries. They derived their name of assassins originally from their immoderate use of hasheesh, which produces an intense cerebral excitement, often amounting to fury. Their founder and lawgiver was Hassan-ben-Sabah, to whom the Orientals gave the name of Sheikh-el-Jobelz, but who was better known in Europe as the "Old Man of the Mountain." Their principal article of belief was that the Holy Ghost was embodied in their chief, and that his orders proceeded from the Deity. They believed assassination to be meritorious when sanctioned by his command, and courted danger and death in the execution of his orders. They were frequently styled Ismaili. A feeble residue of the sect, from whom proceeded the Druses, about A.D. 1020, has survived in Persia and Syria. The Syrian Ismaili dwell around Mesiodé, and on Lebanon. They are under Turkish dominion, with a sheik of their own, and formerly enjoyed a productive and flourishing agriculture and commerce. Since the war with the Nasserians, 1809-10, they have dragged out a miserable existence, but are commended by modern travelers for their hospitality, frugality, gentleness, and piety.

Assault. In law, an assault is a movement virtually implying a threat to strike, as when a person raises his hand or his cane in a menacing manner, or strikes at another but misses him. It is not needful to touch one to constitute an assault. When a blow actually takes effect, the crime is not simple assault, but assault and battery. Assault, however, is usually coupled with battery, and for the reason that they generally go together; but the assault is rather the intimation or offer to commit the act of which the battery is the consummation. An assault is included in every battery. An aggravated assault is one performed with the intention of committing some additional crime, such as an assault with intent to commit rape, assault with intent to murder, an assault with a deadly weapon, an indecent assault. The defenses usually interposed in cases of assault are self-defense, recapture of property, ejectment of trespassers, defense of property, defense of family, accident, etc. A person assaulting another may be prosecuted by him for the civil injury, and also be punished by the criminal law for the injury done to the public.

ASSAYE; ASSAYING

In military language an assault is a furious effort to carry a fortified post, camp, or fortress, where the assailants do not screen themselves by any works. It is the appropriate termination of a siege which has not led to the capitulation of the garrison. To give an assault: To attack any post. To repulse an assault: To cause the assailants to retreat; to beat them back. To carry by assault: To gain a post by storm. In fencing, an assault of arms is an attack on each other (not in earnest), made by two fencers to exhibit or increase their skill. (Sometimes it is used in a wider sense for other military exercises.)

Assaye, as-si', a village in southern India, where Wellington gained a famous victory in 1803. With only 4,500 troops at his disposal he completely routed the Mahratta force of 50,000 men and 100 guns. The victory, however cost him the loss of more than a third of his men.

Assaying, the art of testing ores or alloys, for the purpose of determining the amount of some particular metal that is present in the material analyzed. Assays may be made by "wet" or "dry" methods, and will vary greatly in detail, according to the metal to be determined. The present article will be chiefly devoted to the usual process of estimating gold and silver in the "dry" way. The mode of procedure is substantially the same, whether the assay is made upon ore or upon bullion, except as to the method of obtaining the sample to be examined. If the material proposed for the assay is bullion, or any metallic alloy, the sample for examination is obtained by drilling into the specimen in different places, and mixing the borings. In the case of an ore, the usual method of obtaining a sample for assaying is by "quartering." If this is done by hand, every tenth shovelful of the ore to be examined is thrown upon the floor, until a conical heap containing perhaps ten tons has been accumulated. This heap is next flattened somewhat, and divided into four quarters, as nearly equal as possible. Two of the diagonally opposite quarters are thrown back into the main body of ore, and the remaining two quarters are thoroughly mixed, spread out into a second pile, and "quartered" again in the same manner. The process is continued (the ore being crushed in the meantime as often as appears necessary) until the original sample has been reduced to from one to three pounds, after which it is ground fine, and the specimens desired for examination are made up by random selections from the final pulverized product. More commonly, ores are sampled by mechanical or semi-mechanical methods, and the sampling is not done by the miner, but by a "sampling mill," which acts as the agent both of the miner and of the smelting works. In such cases the ore is first shipped to the sampling mill, where it is unloaded, weighed, crushed, and passed through a chute, in which one quarter is mechanically selected and passed into a separate bin. The quarter thus mechanically reserved is next thoroughly mixed, after which the "cutting down" is commenced. This consists in removing the ore from the floor by means of a specially-constructed sampling shovel which catches about half of it, and lets the remainder fall into a barrow. The ore retained by the shovel is thrown into three buckets, in rotation, and the contents of the buckets are then coned up in one

pile, and divided again in the same manner. The ore is then further crushed, and the process is continued until, finally, three samples, weighing about ten pounds each, are obtained. Part of each of these is sent separately to the assayer, who assays all three. If the results are not adjudged to be sufficiently accordant, the sampler concludes that the mixing was not well done, and the operations described are repeated. But if the three samples agree fairly well, their average is taken as representing the value of the ore; and on this basis the sampler settles with the miner, and afterward with the smelter, thus acting as a middle-man in the sale of the ore.

The specimen of ore received by the assayer is ground fine enough to pass through a 60-mesh or a 100-mesh screen, any "metallics" (or particles of metal that will not pass through the screen being carefully collected and reserved for a separate assay. If the ore is new to the assayer, his next step is to examine it microscopically, and to apply various preliminary tests, so that the general nature of the ore may be known before the quantitative work begins. If assays of the same material have been made before, and the only object is to ascertain the richness of this particular lot of ore, he may proceed directly to the process of "scorification," by which the gold and silver present in the ore are obtained in the form of a metallic button. The scorification process depends for its success upon the fact that when an ore of gold and silver is strongly heated with metallic lead in the presence of air, the base metals that are present will oxidize, and the lead oxid that is also formed will dissolve the silica (or quartz) that is present; while the gold and silver will not oxidize, but will be left in the metallic state, alloyed with that portion of the lead which remains unoxidized. To apply this principle, 50 grains or so of the ore are mixed with some 500 grains of granulated lead, and placed in a sort of crucible, called a "scorifier." Another charge of 500 grains of lead is spread evenly over the mass, and a few grains of borax are sprinkled upon the top. The crucible and its contents are next heated for about three-quarters of an hour in a muffle to which a small amount of air is admitted, after which the melted mass in the crucible is poured into a mold to "set," or cool. When the mold is cold, it will be found to contain a button of metallic lead (in which the gold and silver originally in the ore are concentrated), and also a considerable amount of slag, consisting of oxid of lead, oxids of the base metals that are present in the ore, and silicates of lead, derived from the combination of the melted lead oxid with the quartz of the ore. The slag is readily detached from the metallic button by taps with a hammer.

The next step is to "cupel" the button, so as to obtain the gold and silver in a pure state. Cupellation is based upon the fact that when an alloy of gold, silver, lead, and base metals is heated in a current of air, the lead and the other base metals will oxidize, and the melted lead oxid ("litharge") will retain the other oxids in solution. Moreover, if the crucible in which the operation is carried out is porous, the melted lead oxid will soak into it, carrying the base oxids with it, and leaving a button of pure gold and silver behind.

ASSAY OFFICES—ASSEMBLY OF DIVINES

The "cupel" in which this is performed is made of bone-ash, and after the button left from the scorification process has been heated in the cupel for a short time, the process indicated above takes place, its completion being indicated, to the practised eye, by a play of iridescent colors on the cupelled button. The button is finally allowed to cool, and after it has been taken from the cupel, any small particles of bone-ash that remain adhering to it are removed by a brush.

If the original ore contained no silver, the assay is now completed, and it only remains to weigh the gold button, and compare its weight with that of the sample of ore used in the assay. But if silver is present, one other process, known as "parting," must be carried out, in order to separate the gold from the silver. Parting depends upon the fact that nitric acid will dissolve the silver out of an alloy of silver and gold, *provided* the weight of silver present is at least 2.5 times as great as the weight of the gold. In order to ensure the fulfillment of this necessary condition, the button, as it comes from the cupel, is melted with 2.5 or 3 times its own weight of silver that is known to be free from gold, and the alloy so formed is flattened out into a thin plate or ribbon, which is then rolled up into a little spiral, or "cornet," and boiled in nitric acid. The cornet is next washed in distilled water, and boiled again in nitric acid, to remove the last traces of silver; after which it is thrown into a crucible and melted into a button, for weighing. The button obtained by this final process consists of pure gold.

Assay Offices in the United States are government establishments in which citizens may deposit gold and silver bullion, receiving in return its value, less charges. The offices are in New York city; Boise City, Ida.; Helena, Mont.; Denver, Col.; Seattle, Wash.; San Francisco, Cal.; Charlotte, N. C.; and St. Louis, Mo.

The assay office in New York was established by law in 1853, and was opened in the autumn of 1854. The first assayer of the New York assay office was Dr. John Torrey of Columbia College, who was appointed in 1854 and held his position till 1873. On his death he was succeeded by his son, Herbert Gray Torrey, who has been in the office for 40 years. The superintendent of the assay office is Andrew Mason, who was appointed to his present position in 1883, having previously been assistant assayer and melter and refiner. While holding the latter office he substituted the use of sulphuric for nitric acid in the refining process, thus saving this one assay office \$100,000 per annum.

The United States assay office is in a building located beside the more imposing sub-treasury building, at the intersection of Wall and Broad streets, which marks one of the most historic spots in the country, namely, the site of the old Federal Hall, where Washington took the oath as first President of the United States. Although the building is small, yet it only masks a really large, inner building surrounded on all sides by office buildings and the sub-treasury. The assay offices, and particularly this one, have an important position in the world of finance, for here the precious metals—gold and silver—in all forms and conditions of fineness are assayed and refined. In

brief, the work of this office consists in assaying or determining the value of gold and silver, in whatever form presented, as coin, jewelry, or in any other shape. Any one wishing to have gold or silver assayed in quantity or wishing to sell to the government, may present his property at the assay office, where he may have the metal reduced and made into bars, or if he prefers, he may sell his bullion to the government. The charge for doing the work is merely nominal, and based on the actual cost. Millions of dollars are stored at all times in the vaults. When the metal is received, the first step consists in weighing the coin, bars, jewelry, or tableware. This is done with great exactness and a receipt is given. Each person's holdings are placed in a box and are taken to the melting-room, where they are placed in crucibles with a flux and smelted and cast in ingot molds, the pouring being a highly picturesque operation. A small chip is taken from the bar for assay. See COINAGE.

If the depositor wishes to part with his bullion, the government pays for it at the prevailing price and proceeds to separate or part the gold from the silver. The price of gold never varies, costing \$20.67 a fine ounce. Silver fluctuates with the market.

The importance of the assay office in its relation to the financial world, the treasury, and the mint cannot be overestimated. During the fiscal year ending 30 June 1900, the fineness of 11,802 melts of gold and silver deposits, 993 melts of fine gold and silver, also 1,050 melts of mixed metal, about 500 special deposits, 350 barrels of sweeps, 83,178 gold and silver bars were estimated, and about 60,000 cupels and the necessary "proof" gold and silver were made.

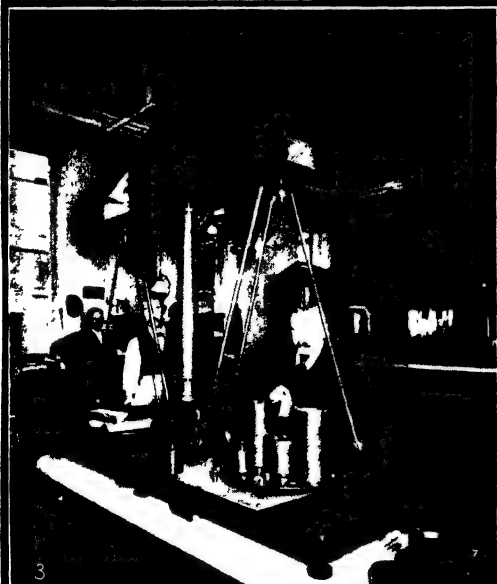
Assay Offices. See ASSAYING.

Assegai, ăs'se-gă, a short spear employed as a weapon among the Kaffirs of South Africa. It is made of hard wood tipped with iron, and used for throwing or thrusting.

Assemani, as'-e-ma'ne, (1) JOSEPH SIMON, a famous Orientalist: b. of a Maronite family in Tripoli, Syria, 1687; d. Rome, 14 Jan. 1768. He traveled on the Pope's commission through Egypt and Syria, collecting many Oriental manuscripts and coins for the Vatican library, of which he was appointed keeper. Of his numerous learned works, the most important is his 'Bibliotheca Orientalis Clementino-Vaticana' (1719-28), containing the Syrian manuscripts of the Vatican. He was succeeded as keeper of the Vatican library by his nephew. (2) STEPHEN EPHODIUS (1707-82), also a learned author of books on Oriental learning. He was titular bishop of Apomaca. Yet another nephew and Orientalist was (3) JOSEPH ALOYSIUS (1710-82), professor at Rome. (4) SIMON, a relative of the preceding, b. in Tripoli 1752; d. Padua 8 April 1821. He filled the chair of Oriental languages at Padua. One of the greatest Orientalists of his time, he wrote an important work on ancient coins, 'Museo Cufico Naniano Illustrato' (1787-8).

Assem'ly, Constituent. See ASSEMBLY, NATIONAL.

Assem'ly of Divines, a celebrated assembly appointed by the Long Parliament, and held at Westminster to determine upon the doctrine



¹ Humid Assay for Silver. ² Muffle Furnaces for Fire Assay. ³ Weighing Room. ⁴ Pressing the Assay Sample.

ASSEMBLY — ASSESSOR

and liturgy of the English Church. By an ordinance passed 12 June 1643, 121 clergymen, with 10 Lords and 20 Commoners as lay assessors, were nominated as constituents of the assembly. The assembly began its sittings in July 1643, in Westminster Abbey, but in the meantime a royal proclamation had been issued forbidding the assembly to meet, which had the effect of inducing the greater part of the Episcopal members to absent themselves. The majority of those who remained were Presbyterians, but there was a strong minority of independents. A deputation was now sent along with commissioners from the English Parliament to the General Assembly of the Scottish Church and the Scottish Convention of Estates, soliciting their co-operation in the proceedings of the Westminster Assembly, and in September four Scottish clergymen, with two laymen, were admitted to seats and votes. The assembly continued to hold its settings till February 1649. Among the results of its deliberations were the Directory of Public Worship, the Confession of Faith, and the Larger and Shorter Catechisms, which remain practically the standards of the Presbyterians to the present day. At the Restoration the whole proceedings of the Westminster Assembly were annulled as invalid. See Hethorington, 'History of the Westminster Assembly,' 1843; Masson, 'Life of Milton' (1858-79).

Assem'ly, General, the name applied to the highest ecclesiastical court of the Established Church of Scotland. It consists of delegates from every presbytery, university, and royal burgh in Scotland, holds meetings annually, in the month of May, and usually continues to sit for 12 days. In its judicial capacity and as the court of last resort, the General Assembly has a right to determine finally every question brought from the inferior courts, by reference, complaint, or appeal. The laws enacted by the assembly, after receiving the sanction of a majority of presbyteries, are the established and permanent statutes of the Church, by which everything belonging to the ecclesiastical state, or to the Church courts, is authoritatively regulated. The United Free Church of Scotland has a General Assembly similar in its constitution and functions to that of the Established Church, and the same is true of the Presbyterian churches of Ireland and America. See PRESBYTERIAN CHURCHES.

Assem'ly, National, a body established in France in 1789. Upon the convocation of the states-general by Louis XVI., the privileged nobles and clergy refused to deliberate in the same chamber with the commons, or *tiers-état* (third estate). The latter, therefore, on the proposition of the Abbé Siéyès, constituted themselves an *Assemblée Nationale*, with legislative powers, 17 June 1789. They bound themselves by oath not to separate until they had furnished France with a constitution, and the court was compelled to give its assent. In the 3,250 decrees passed by the assembly were laid the foundations of a new epoch, and having accomplished this task, it dissolved itself 30 Sept. 1791. The term is also applied to a joint meeting of the Senate and Corps Legislatif, for the purpose of electing a chief magistrate or the transaction of other extraordinary business. See

Stephens, 'History of the French Revolution' (1886-91); Doniol, 'La Révolution et la Féodalité' (1874).

As'sen, a'sën, the capital of the province of Drenthe, Holland. Near it are the Giants' Caves, to which Tacitus makes allusion. Pop. 11,191.

Assent', in law, an undertaking to do something in compliance with a request. Approval of something done. Express assent is that which is openly declared. Implied assent is that which is presumed by law. Assent must be to the same thing in the same sense. It must embrace the whole of the proposition, must be exactly equal to its extent and provisions, and must not qualify them by any new matter. Unless express dissent is shown, acceptance of what it is for a person's benefit to take, is presumed, as in the case of a conveyance of land.

The Royal Assent is the approbation given by the sovereign in Parliament to a bill which has passed both houses, after which it becomes a law. It may be given in person, when the sovereign comes to the House of Peers and the assent (in Norman French) is declared by the clerk of Parliament; or may be declared by letters-patent under the great seal, signed by the sovereign.

Asser, a'ser, John, a learned British ecclesiastic, distinguished as the instructor, and biographer of Alfred the Great. He was appointed abbot, by Alfred, of two or three different monasteries, and at last promoted to the Episcopal See of Sherborne, where he died in 908 or 910. He wrote the life of Alfred ('*Annales Rerum Gestarum Ælfredi Magni*'), which was first published at the end of Parker's edition of Walsingham's History (London, 1574) in Camden's Historical Collection (at Frankfurt). A separate edition was published at Oxford in 1722. An English translation is given in Bohn's Antiquarian Library.

Assess'ment is the determining of the value of a man's property or occupation for the purpose of levying a tax. Determining the share of a tax to be paid by each individual. Laying a tax. Adjusting the shares of a contribution by several toward a common beneficial object according to the benefit received. Assessment of damages includes fixing the amount of damages to which the prevailing party in a suit is entitled. It may be done by the court through its proper officer, the clerk or prothonotary, where the assessment is a mere matter of calculation, but must be done by a jury in other cases. Insurance assessment is an apportionment made in general average upon the various articles and interests at risk, according to their value at the time and place of being in safety for contribution for damage and sacrifices purposely made, and expenses incurred for escape from impending common peril. An assessment is also made upon premium-notes given by the members of mutual fire insurance companies, constituting their capital, and being a substitute for the investment of the paid-up stock of a stock company, the liability to such assessments being regulated by the charter and by-laws, 12 N. Y. 477; 14 Bart. N. Y. 374.

Asses'sor, a person appointed to ascertain and fix the amount of taxes, rates, etc., or one who sits with the judges in certain courts,

ASSETEAGUE — ASSINIBOIN

and assists them with his professional knowledge.

Asse-teague (ăs'se-tēg') **Island**, a small island off the coast of Virginia in Northampton County. Upon it is a lighthouse 150 feet in height.

As'sets (French, *assez*, enough), a term denoting property or goods available for the payment of a bankrupt or deceased person's obligations. Assets are either personal or real, the former comprising all goods, chattels, etc., devolving upon the executor as salable to discharge debts and legacies. In commerce and bankruptcy the term is often used as the antithesis of liabilities, to designate the stock in trade and entire property of an individual, or an association. See **BANKRUPTCY**.

Assiento, asyān'tō (Spanish, *asiento*, seat, contract, treaty), a term especially applied to an agreement between the Spanish government and a foreign nation to import negro slaves from Africa into the Spanish colonies in America, for a limited time, on payment of certain duties. The English were the sole possessors of this assiento till 1701. In 1713 the celebrated assiento treaty with Britain for 30 years was concluded at Utrecht. By this contract the English, among other privileges, obtained the right of sending a *permission* or *assiento ship*, so called, of 500 tons every year, with all sorts of merchandise, to the Spanish colonies. By the treaty of Madrid, 5 Oct. 1750, the contract was annulled.

As'signa'tion. See **ASSIGNMENT**.

Assignats, a-se-nyā, or ăs-īg-nāts, a term applied to the paper money issued during the French Revolution. The French National Assembly after appropriating to national purposes the land belonging to the Church, instead of selling it at a time when its value was greatly depreciated, because of the unsettled state of affairs, issued bonds on the security of it, which were called assignats, as representing land *assigned* to the holder. This paper currency consisted chiefly of notes for one hundred francs each, though many of them were for lower sums. The first issue in 1790 amounted to 400,000,000 francs. The government was relieved by this plan, for the time being the assignats saved the Revolution. This arrangement for relieving the necessities of the government seemed so easy that recourse was repeatedly had to it, as the property of wealthy emigrés, until the amount arose to the vast sum of 46,000,000,000 francs, besides many forged notes. The consequence was that the value of assignats sank to almost nothing. In March 1796, a louis d'or (24 francs) bought 7,200 francs in assignats. They were withdrawn from the currency after this, and redeemed at a thirtieth of their nominal value, by "territorial mandates," a new kind of paper currency, which empowered the holder at once to take possession of public lands at the estimated value, while assignats could only be offered at a sale. These territorial mandates afterward became almost worthless and were returned to the government in payment of taxes or of land. Early in 1797 the system came suddenly to an end.

As'signee', any person appointed by another to transact some business, or exercise some

particular privilege or power. Formerly the persons appointed under a commission of bankruptcy, to manage the estate of the bankrupt on behalf of the creditors, were so called, but are now known as trustees, or receivers. The term assignee is also used to designate one to whom an assignment has been made.

Assign'ment, a term denoting a transfer by deed of any property, or right, title, or interest in property, real or personal. Assignments are usually given for leases, mortgages, and funded property. In the United States, assignment is of broader signification and applies also to the transfer of real property by certain conveyance. In general, every right of property, real or personal, and every demand connected with a right of property, real or personal; and all choses in action, as bonds, notes, judgments, mortgages, debts, contracts, agreements, relating both to real and personal property, are assignable, and the assignment thereof will pass to the assignee a right of action in the name of such assignee against all parties liable to an action. Assignment carries with it all collateral securities held by the assignor for the collection of a debt or the fulfillment of a contract, and is subject to all the equities and charges which attached in the hands of the assignor. A personal trust, as the right of a master in his indentured apprentice, or the duties of a testamentary guardian, or the office of executor, trustee, etc., is not assignable. The validity of an assignment must be determined by the law of the State in which it was made, provided the thing assigned is subject of municipal or State law; but copyrights, patents, and government claims are governed by acts of Congress. In general, assignments should be recorded in the office prescribed by law, or are void as against those claiming under subsequent assignments. See **BANKRUPTCY LAWS**.

Assimilation, a term denoting the transformation of foods into living substance. The animal body is constantly changing. New compounds are being made from others; old products are cast off. There is a constant interchange of materials, some building up, others breaking down. Assimilation is one of the processes contributing to the building up or anabolic changes in the bioplasm of the animal body. The balance of nutrition is determined by the incomings and the outgoings of the human metabolism. The chief factors in the assimilative process are the foods and the oxygen in the air. For a discussion of the former, see **DIGESTION**; **NUTRITION**; for the latter, see **RESPIRATION**. See also **METABOLISM**.

Assiniboia, ăs-sin'ī-boi'a, a district in northwestern Canada, west of Manitoba, having the district of Saskatchewan on the north, and Alberta on the west. Its area is 90,340 square miles. It is intersected by the Saskatchewan, Assiniboine, and Qu'Appelle rivers, and some coal is mined within its borders. Its capital, Regina, is on the Canadian P. Ry., which intersects the district. Pop. (1901) 67,385.

Assiniboin, ăs-sin'ī-boin, the name of a tribe of Indians of Siouxian stock, numbering about 2,670 persons, of whom some 1,300 are living in Montana and the remainder in Canada.

Assin'iboine, a river of Canada, which flows through Manitoba and joins the Red River at Winnipeg, about 40 miles above the entrance of the latter into Lake Winnipeg. It has a somewhat circuitous course of about 500 miles from the west and northwest and steamers ply on it for over 300 miles.

Assisi, as-sē'sē, a hill town in Italy, in the province of Umbria, 20 miles from Spoleto. It is the see of a bishop and is famous as the birth-place of St. Francis d'Assisi, and for the splendid church built over the chapel where St. Francis received his first impulse to devotion. This church is one of the finest remains of the architecture of the Middle Ages in the Gothic style. Pop. (1901) 17,378. See "Assisi" in 'Mediaeval Towns Series' (1901); Cruikshank, 'The Umbrian Towns' (1901).

Assize of Jerusalem, a code of laws in force in the Christian kingdom of Jerusalem and Cyprus. It consisted of two parts, the assize of the high court with jurisdiction over the nobles, and the assize of the court of burgesses, or code of the common people. It was supposed for some time that the laws were framed by Godfrey de Bouillon; but this is now known to be incorrect. The assize of the high court was first framed as a code about 1255, the assize of the court of Burgesses, in the latter part of the 12th century, but the exact date is uncertain.

Assizes, an English legal term signifying the sessions of the courts held at intervals in every country by the judges. The whole country is divided into circuits, and three times in the year two judges, who are members of the highest courts in England, hold assizes in all the counties of their respective circuit. In London and Middlesex, instead of circuits, what are known as courts of *ni prius* are held. At the assizes all the justices of the peace of the county are bound to attend, or else are liable to a fine; and also all the persons who have been summoned as grand jurymen or petit jurymen by the sheriff. At these assizes the judges sit under five separate commissions, some of which relate to civil and some to criminal causes or business. In this manner, and by these means, the jails are in general cleared, and offenders tried and convicted or acquitted at least every half year. In America there are no courts or sessions of courts technically called assizes. The judges, however, perform the same duties in the counties, within their respective circuits and jurisdictions, as the English judges, and generally in the same manner, that is to say, according to the course of the common law. Since 1808 there have been assize courts in the judicial system in France. With the English institutions, however, they have scarcely anything in common but the name. In the law of Scotland assize is the technical term applied in cases tried in the court of justiciary to the jury of 15 sworn men, selected by ballot from a greater number not exceeding 45.

Associated Press. See PRESS ASSOCIATIONS.

Association Areas. In the brain of many lower animals as well as in that of man there are definite areas associated with other areas by sets of fibres, known as association fibres.

These different areas act together in performing many of the complicated acts of human life. Thus, the general sensory area in the brain, that feels the skin sensations and determines their character, is in close association with the motor area determining the movements of the body in correspondence with the knowledge given by the sensory areas. Under the heading APHASIA several of these association areas are discussed. The studies of psychology and of mental diseases are largely concerned with the relations and connections of the association areas in the brain.

Bibliography.—Flechsig, 'Die Gehirn und Seele' (1896); Barker, 'Journal of Nervous and Mental Disease,' 1897, pp. 326-356.

Association Fibres, a term applied to those fibres that connect different parts of the brain, particularly those that unite different areas in the same hemisphere, distinguishing them from the commissural fibres that connect areas in different hemispheres, or projection fibres that bind the cerebrum with the lower cerebellar or spinal systems. These association fibres form late in childhood and on their development depends much of the increased intellectual growth of the individual.

Association of Ideas, a phrase current in philosophy and psychology since the days of John Locke. The term "association" has had, in this connection, many different meanings. In popular psychology, it indicates the way the mind passes from idea to idea; or the way one idea suggests or "reproduces" another. Thus, in passing from the thought of gold to the recollection of a recent visit to a mining camp and then to the plot of a novel laid in a mountainous region, one may be said to "associate" the story with the idea of the mining camp, and this, in turn, with the idea of gold. (See MEMORY.) It is but a step from this popular conception of association—association as "reproduction"—to the notion that association is an explanation of reproduction. Association then becomes (to change the figure) not the actual passage from idea to idea, but the intangible bond which holds ideas together and which enables one idea (that is, the "gold" idea) to drag after it another (the "camp" idea). This second interpretation of the term is in disrepute among psychologists because no evidence of such a bond as the interpretation implies is to be found in consciousness. It may be urged, however, that even if association in this causal sense be undiscoverable by introspection it may, nevertheless, be regarded as a general principle of mental activity;—as the means by which the mind creates knowledge. When, however, association is thus interpreted to mean a principle underlying and conditioning the process of knowing it passes from psychology to epistemology. (See PSYCHOLOGY.) The doctrine of Associationism, which is connected with the names of David Hume, James Mill, Alexander Bain and other "associationists," rests upon this epistemological meaning of the term.

Returning to the psychological use of the word "association," we may note that the popular conception stands in need of modification and precision. (1) To say that mind "associates" idea with idea implies that ideas are by nature

separate and distinct and require some "gentle force" (as Hume puts it) to bring them together. This is not true. Ideas are interwoven; they are organically connected; they are not held together as in a bundle. (2) In the second place, the popular use of the term is too narrow; a chain of actions, or of emotions, or of feelings, may be associated as well as a chain of ideas. In habitual performances, for example,—such as dressing—one act calls forth the next, this in turn the next, and so on; or emotion may be linked with emotion, as anger following fear; or, finally, associations may set out from a perception, as the thought of home from the sight of a letter. (3) Again, association does not necessarily imply a sequence of associated elements. It may be simultaneous, as well as successive; for example, I see the table before me and, at the same time, I apprehend it as a hard resisting substance, or I hear the rumble of a carriage behind me and I see, in my "mind's eye," its form and color. (See PERCEPTION.)

(4) Finally, association in the popular sense simply states that idea follows idea; it tells us nothing of the nature of the associated consciousness; of how, that is, an association differs from a perception. Now association, in its strict technical sense, means the associated elements of consciousness; to illustrate, it means the mass of constantly shifting processes which make up mind while one is thinking gold—mining—camp—novel. Just as there exist typical groups of mental processes which underlie the perception of a landscape, a swinging pendulum or a musical composition, there exist other typical groups—such as those already mentioned—which are known as associations.

Psychological work upon association has been directed, for the most part, upon the conditions under which associative groups arise. These conditions have, since the days of Aristotle, been set down under the heading of "principles" or "laws" of association. Thus *a* is said to call up or reproduce *b* when *a* and *b* have, at some previous time, stood together in consciousness (law of contiguity), or when *a* has been the cause of *b* (law of causality), or when *a* resembles *b* (law of similarity), etc. At the present time, these "laws" of association are usually reduced to two; the law of contiguity and the law of similarity. But even these are by no means final or adequate statements of the conditions under which associations arise; for—to point to only two or three of their imperfections—"similarity" is an extremely ambiguous term; it may mean simple likeness, or partial identity, or likeness of relationship; and "contiguity" is indefinite—it does not determine how near processes must lie in consciousness in order for one to reproduce the other. Moreover, it should be said that there are thousands of contiguity and similarity connections that are never realized in association; this follows from the fact that almost everything is, to some extent, similar to everything else, and that the elementary processes of mind have appeared "contiguously" in almost every conceivable form of combination. Both terms are, then, too broad to have much significance. If we set them down as "laws," we have still to determine under what particular conditions a given association is formed. Many of these particular and more important conditions have been determined; they include recency, frequency, vividness (the more recently

or frequently or vividly a process or group of processes has stood in consciousness the greater the liability of its appearing in an associative connection), the general interests of the individual mind (for example, botanical ideas crop up in the botanist's mind, geological ideas in the mind of the geologist), the presence or absence of inhibitory associations (if *a* has already stood associated with *b* and *c*, its chances for associating with *d* will be lessened), mood (unpleasant subjects crowd into mind when one is depressed), etc. The actual liability of a given association being formed is thus seen to rest upon a great number of possible conditions. So far as there is any truth in a general all-inclusive "law" of association it is best expressed as a law of neural habit. This law is formulated by W. James as follows: "when two elementary brain-processes have been active together or in immediate succession, one of them, on reoccurring, tends to propagate its excitement into the other." The relation of this law to the law of contiguity is obvious.

Consult: James, 'Principles of Psychology' (1890), ch. xiv.; Titchener, 'Experimental Psychology,' pt. II. (1901), 402; Kuelpe, 'Outlines of Psychology' (trans. 1895), 177ff; Calkins, 'Introduction to Psychology' (1901), 157ff.

I. M. BENTLEY,
Assistant Professor of Psychology, Cornell University.

Association for the Protection of the Adirondacks, a society organized in 1902 and incorporated the same year for the purpose of preserving the forests, waters, game, and fish, and to maintain healthful conditions in the Adirondack region.

Assollant, as'sō'lān', Alfred, a French novelist and political writer; b. Aubusson, 20 March 1827; d. Paris, March 1880. Having traveled extensively over the United States, he published, on his return, 'Scenes from Life in the United States' (1858), a series of tales which attracted a good deal of attention. Among his numerous novels are 'Two Friends in 1792' (1859), a story of the Reign of Terror; 'Brancas' (1859), a picture of the corruption under Louis Philippe; 'Gabrielle de Chênevert' (1865), portraying the provincial nobility before the Revolution; 'Pendragon' (1881), and 'Plantagenet' (1885).

Assommoir, L', la'sō'mwār', a novel by Emile Zola, entitled 'Gervaise' in the English translation, published in 1877. It forms one of the series dealing with the fortunes of the Rougon-Macquart family, and is a series of repulsive pictures unrelieved by one gleam of a nobler humanity, but only "realistic" as scraps: the life as a possible whole is as purely imaginative as if it were lovely instead of loathsome.

As'sonance, in poetry, a term used when the lines end with the same vowel-sound, but make no proper rhyme. Such verses having what we should consider false rhymes are regularly employed in Spanish poetry; as in *ligeras*, *cubierta*, *tierra*, *mesa*.

Assos, ās'ōs, an ancient Hellenic port on the Gulf of Edremid, from whose still imposing remains the successful excavations, in 1881-3, of the American Institute of Archaeology have brought to light the agora, with senate house and colonnade, a bath, theatre, gymnasium, statues of heroes, and seven Christian churches.

ASSOUAN

Assouan, a-swān', or Assuan, also called Eswan (Arabic *al suaan*, "the opening," that is, of the Nile; the ancient Syene, whence the red granite of the vicinity—from whose famous quarries were cut under the earliest dynasties so many of the huge obelisks and colossal statues that adorned the temples and palaces of Egypt—is called syenite), the southernmost city of Egypt proper, near Nubia, on the right or eastern bank of the Nile, and beside the first or lowest cataract. Near it are the islands of Philæ and Elephantine, the ruined monuments of the former of which are of such fascination to tourists; on the left bank are many rock tombs of the ancient dynasties. It is a garrison town, the central depot for the Sudan caravan trade, and the terminus of a railway to Alexandria which enhances its prosperity. Of still greater importance is the new dam which will add several hundred square miles outright to the arable soil of Egypt, besides steadying the fertility of the older lands, and which is described *in extenso* below. Pop. about 10,000, including the suburbs.

The monumental dam at Assouan, by far the greatest achievement of the kind in ancient or modern times, forms a reservoir in the Nile valley capable of storing 1,000,000,000 tons of water. It will not only produce a revolution in the primitive and laborious methods of irrigation in Egypt, but will reclaim vast areas of land that have hitherto been accounted as arid and worthless. The old system of irrigation was little more than a high Nile flooding of different areas of land or basins surrounded by embankments. Less than a hundred years ago, the introduction of perennial irrigation was first attempted by cutting deep canals to convey the water to the lands when the Nile was at its low summer level. When the Nile rose, these canals had to be blocked by temporary earthen dams, or the current would have wrought destruction. As a result, they silted up, and had to be cleared of many millions of tons of mud each year by enforced labor, much misery and extortion resulting therefrom. About half a century ago the first serious attempt to improve matters was made by the construction of the celebrated Barrage at the apex of the delta. This work consists, in effect, of two brick-arched viaducts crossing the Rosetta and Damietta, branches of the Nile, having together 132 arches of 16 feet 4 inches span, which were entirely closed by iron sluices during the summer months, thus heading up the water some 15 feet and throwing it at a high level into the six main irrigation canals below Cairo. In the summer months the whole flow of the Nile is arrested and thrown into the aforesaid canals. The old Barrage was constructed under great difficulties by French engineers, subject to the passing whims of their Oriental chiefs. About 15 years elapsed between the commencement of the work and the closing of all the sluices, and another 20 years before the structure was sufficiently strengthened by British engineers to fulfil the duties for which it was originally designed. Forced labor was largely employed in its construction, and at one time 12,000 soldiers, 3,000 marines, 2,000 laborers, and 1,000 masons were at work at the old Barrage.

In connection with the Nile reservoir, subsidiary weirs were constructed below the old Barrage to reduce the stress on that structure.

The system adopted was a novel one, devised by Major Brown, inspector-general of irrigation in lower Egypt. His aim was to dispense almost entirely with plant and skilled labor; and so, without attempting to dry the bed of the river, he made solid masonry blocks under water by grouting rubble dropped by natives into a movable timber caisson. Both branches of the Nile were thus dammed in three seasons, at a cost, including navigation locks, of about \$2,500,000. Many other subsidiary works have been and will be constructed, including regulators, such as that on the Bahr Yūsuf canal. The most important of the works is the Barrage across the Nile at Assiout, about 250 miles above Cairo, which was commenced by Sir John Aird & Co. in the winter of 1898 and completed in 1902. The great dam at Assouan, 850 miles above Cairo, is not a solid wall, but is pierced with sluice openings of sufficient area for the flood discharge of the river, which may amount to 15,000 tons of water per second. There are 180 such openings, mostly 23 feet high by 6 feet 6 inches wide; and where subject to heavy pressure when being moved they are of the well-known Stoney roller pattern. The total length of the dam is about 1¼ miles; the maximum height from foundation, about 130 feet; the difference of level water above and below, 67 feet; and the total weight of masonry over 1,000,000 tons. Navigation is provided for by a "ladder" of four locks, each 260 feet long by 32 feet wide. As was the case at Assiout, the difficulties in dam construction are not in design, but in the carrying out of the works. When the "rotten rock" in the bed was discovered, Sir Benjamin Baker reported to Lord Cromer frankly that he could not say what the extra cost or time involved by this and other unforeseen conditions would be, and that all that could be said was that, however bad the conditions, the job could be done. Lord Cromer replied that the dam had to be completed whatever the time and cost involved. The contract was let to Sir John Aird & Co., of London, with Messrs. Ransomes and Rapier, of London, as sub-contractors for the steel work, in February 1898. Two months after signing the contract the permanent works were commenced, and before the end of the year thousands of native laborers and hundreds of Italian granite masons were hard at work. On 12 Feb. 1899, the foundation stone of the dam was laid by the Duke of Connaught. Many plans were considered by the engineers and contractors for putting in the foundations of the dam across the roaring cataract channels, and it was finally decided to form temporary rubble dams across three of the channels below the site of the great dam, so as to break the force of the torrent and get a pond of comparatively still water up stream to work in. Stones of from 1 ton to 12 tons in weight were tipped into the cataract, till finally a rubble mound appeared above the surface. The first channel was successfully closed on 17 May 1899, the depth being about 30 feet and the velocity of current nearly 15 miles an hour. In the case of another channel the closing had to be helped by tipping in railway cars themselves, loaded with heavy stones and bound together with wire ropes, making a mass of about 50 tons, the great mass being necessary to resist displacement by the torrent.

ASSUMPSIT—ASSUMPTION

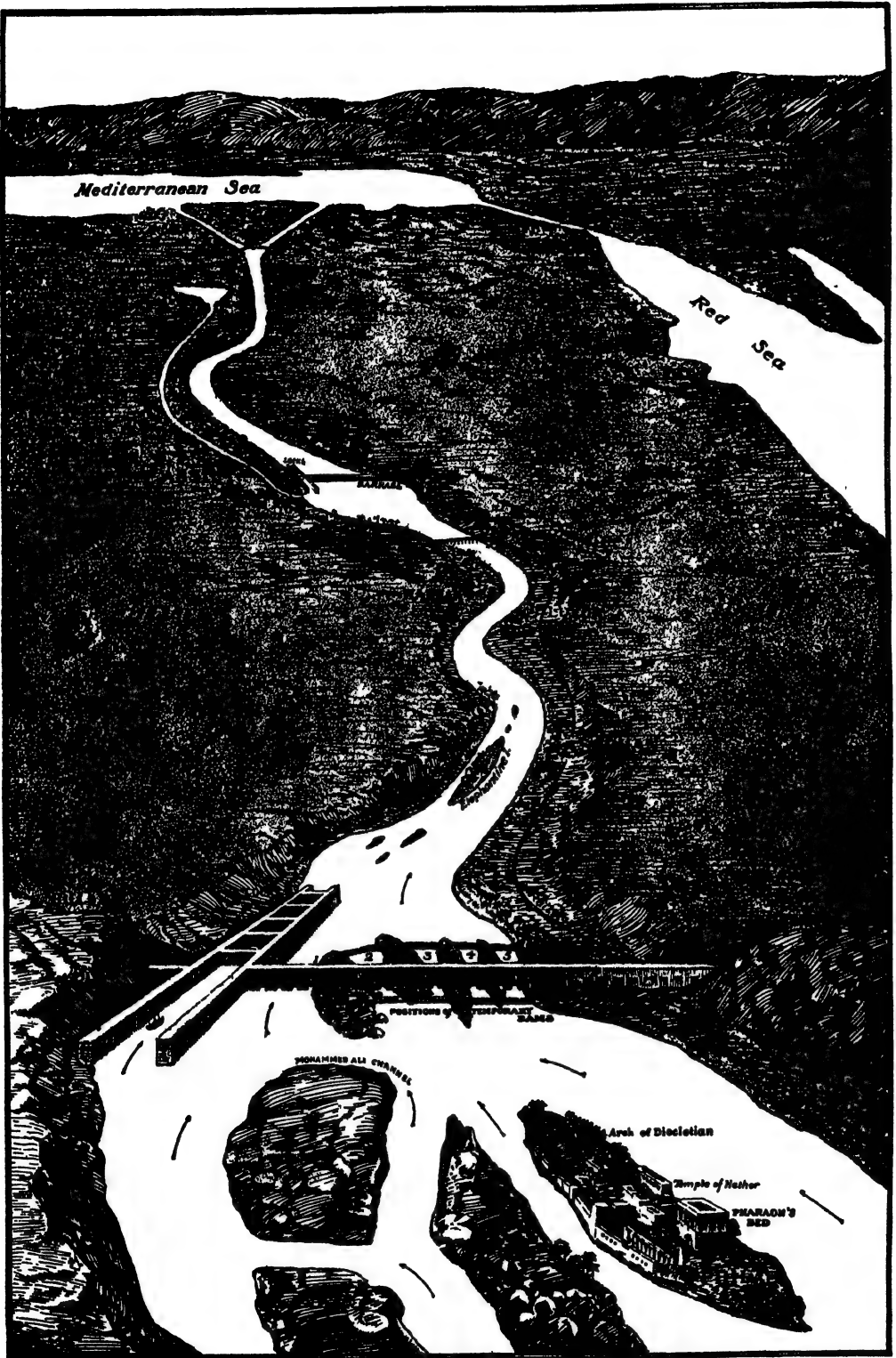
These rubble dams were well tested when the high Nile ran over them; and on work being resumed in November, after the fall of the river, water-tight sandbag dams, or "sudds," were made around the site of the dam foundation in the still waters above the rubble dams, and pumps were fixed to lay dry the bed of the river. This was the most exciting time in this stage of the operations, for no one could predict whether it would be possible to dry the bed, or whether the water would not pour through the fissured rock in overwhelming volume. Twenty-four 12-inch centrifugal pumps were provided to deal, if necessary, with one small channel; but happily the sandbags and gravel and sand embankments stanching the fissures in the rock and interstices between the great boulders covering the bottom of this channel, and a couple of 12-inch pumps sufficed. The masonry of the dam is of local granite, set in British Portland cement mortar. The interior is of rubble set by hand, with about 40 per cent of the bulk in cement mortar, four of sand to one of cement. All the face work is of coursed rock-faced ashlar, except the sluice linings, which are finely dressed. This was steam crane and Italian masons' work. There was a great pressure at times to get a section completed before the inevitable rise of the Nile, and as much as 3,600 tons of masonry was executed per day, chiefly at one point in the dam. A triple line of railway and numerous cars and locomotives were provided to convey the materials from quarries and stores to every part of the work. The maximum number of men employed was 11,000, of whom 1,000 were European masons and other skilled men. Mr. Wilfred Stokes, chief engineer and managing director of Messrs. Ransomes and Rapier, was responsible for the detailed designing and manufacture of the sluices and lock gates; 140 of the sluices are 23 feet high by 6 feet 6 inches wide, and 40 of them half that height; 130 of the sluices are on the "Stoney" principle with rollers, and the remainder move on sliding surfaces. The larger of the Stoney sluices weigh 14 tons, and are capable of being moved by hand under a head of water producing a pressure of 450 tons against the sluice. There are five lock gates, 32 feet wide, and varying in height up to 60 feet. They are of an entirely different type from ordinary folding lock gates, being hung from the top on rollers, and moving like a sliding coach-house door. This arrangement was adopted for safety, as 1,000,000,000 tons of water are stored up above the lock gates, and each of the two upper gates is made strong enough to hold up the water, assuming that the four other gates were destroyed. When the river is rising the sluices will all be open, and the red water will pass freely through, without depositing the fertilizing silt. After the flood when the water has become clear, and the discharge of the Nile has fallen to about 2,000 tons per second, the gates without rollers will be closed, and then some of those with rollers; so that between December and March the reservoir will be gradually filled. The reopening of the sluices will take place between May and July, according to the state of the Nile and the requirements of the crops. Between December and May, when the reservoir is full, the island of Philæ will in places be slightly flooded. As the temples are founded partly on

loose silt and sand, the saturation of the hitherto dry soil would cause settlement, and no doubt injury to the ruins. To obviate this risk, all the important parts, including the well-known Kiosk, or "Pharaoh's bed," have been either carried on steel girders or underpinned down to rock; or failing that, to the present saturation level. It need hardly be said that having regard to the shattered condition of the columns and entablatures, the friability of the stone, and the running sand foundation, the process of underpinning was an exceptionally difficult and anxious task. It is impossible to estimate the far-reaching beneficial influence these irrigation works will bestow upon Egypt; but the reclamation of so many thousands of acres of desert for agricultural development cannot fail to improve the agricultural possibilities of the land, and assist Egypt to regain the prosperity it enjoyed in the era of the Pharaohs, with a greater cultivable area than it had even then. See IRRIGATION; NILE.

Assump'sit, in law, an action to recover a compensation in damages for non-performance of a simple contract; that is, a promise, whether verbal or written, not contained in a deed under seal. The word *assumpsit* (Latin) means, he undertook, and was taken as the name of this action from its occurrence in declarations, that is, formal statements of the plaintiff's cause of action, when these were in Latin. Assumpsits were of two kinds, *express* and *implied*, the former being where the contracts were actually made in word or writing; the latter being such as the law implies from the justice of the case; as, for instance, if I employ a workman to do any work for me, the obvious justice of my paying him a reasonable sum for that work, when done, raises an implication, in the understanding of the law, of a promise on my part to pay him.

Assump'tion, a city in Paraguay. See ASUNCION.

Assump'tion, a Church festival celebrating the translation into heaven of the Virgin Mary, kept on 15 August. The legend first appeared in the 3d or 4th century, and the festival was instituted some three centuries later. The story has been made the subject of a number of paintings by the most celebrated artists in history. The following are the best known: (1) Titian: in the Accademia in Venice, represents the Virgin being carried on bright clouds to heaven, surrounded by rejoicing angels, while the apostles look up from earth in amazement; (2) Titian: another painting in the Cathedral of Verona; (3) Correggio: frescoes in the cupola of the cathedral in Parma, Italy; (4) Rubens: painting in the cathedral at Antwerp, Belgium; representing the Virgin being carried to heaven, surrounded by angels, while several apostles and women are gathered at the empty tomb below; (5) Perugino: in the Accademia, in Florence; showing, in addition to the Virgin, four saints in the foreground; the representation of the Virgin is considered one of Perugino's most beautiful figures; (6) Guido Reni: a large canvas in Bridgewater House, in London; (7) Gaudenzio Ferrari: fresco in the Church of San Cristoforo, in Vercelli, Italy; showing figures of the Father, the Virgin, the angels, and the apostles; (8) Murillo: painting in the Hermitage Museum, St. Petersburg; representing the Virgin floating



ASSOUAN DAM.

Bird's-eye View of the Structure and Surrounding Region.

ASSURANCE — ASSYRIA

upward on clouds, with bands of cherubs above and below her; considered a typical display of the painter's qualities of grace and expression; (9) Guercino: a painting, also in the Hermitage Museum; showing the Virgin, with uplifted face, being borne upward on a cloud, with angel attendants, and the apostles standing about her empty tomb. 'The Assumption of Moses' is the title of an apocryphal book, giving an account of the reception of Moses in heaven, written probably 20 A.D.

Assu'rance. See **INSURANCE**.

Assurbanipal, äs'soor-ba'ne-päl'. See **ASSYRIA**; **NINEVEH**; **SARDANAPALUS**.

As'sus. See **ASSOS**.

Assynt, äs'int, a wild and rugged district of Scotland. Some of its mountains are of considerable elevation, and the loftiest, Ben More, rises to the height of 3,230 feet. There are inexhaustible quarries of marble, both white and variegated. Fresh-water lakes are numerous; the largest, Loch Assynt, is about seven miles in length and one in breadth.

Assyr'ia (the *Asshur* of the Hebrews, *Athura* of the ancient Persians), the ancient name of a portion of Mesopotamia, lying mainly between the Euphrates and the Tigris, the seat of the earliest recorded monarchy. In the earliest times it was probably limited to the low-lying tract between the Jebel Makloub and the little Zab (Zab-Asfal), on the left bank of the Tigris; but at its greatest extent Assyria must have been nearly 500 miles long, with an area of about 100,000 square miles. Toward the north Assyria bordered on the mountainous country of Armenia, which may at times have been under Assyrian dominion, but which at no time was considered as an actual part of the country. On the east dwelt numerous independent and warlike tribes, sheltered by the fastnesses of the Zagros Mountains. On the south Susiana or Elam was the frontier state east of the Tigris, while Babylonia occupied the same position between the rivers. West of Assyria lay Arabia, and higher up Syria and the land of the Hittites. The chief cities of Assyria in the days of its greatest prosperity were Nineveh, whose site is marked by the mounds opposite Mosul (Nebi Yunus and Koyunjik), Calah or Kalakh (the modern Nimrud), Asshur or Al Asur (Kalash Sherghat), Sargina, Khorsabad), Arbela (Arbil), etc. The surface of the country within its widest limits was of a diversified character. On the north and east the lofty mountain-ranges of Armenia and Kurdistan are succeeded by low ranges of arid limestone hills, occasionally enclosing fertile plains and valleys. Immediately south of this is a well-watered, productive, and undulating belt of country, into which run limestone rocks of a golden color, and wooded with dwarf-oak. This sinks suddenly down upon the great Mesopotamian plain (the modern El Jezireh), about 250 miles in length, interrupted only by a single limestone range rising suddenly out of the plain and branching off from the Zagros Mountains. The numerous remains of ancient habitations show how thickly this vast flat must have once been peopled; now, for the most part, it is a mere wilderness.

History.—Scripture tells us that the early inhabitants of Assyria went from Babylon, and

the traditions of later times, as well as inscriptions on the disinterred Assyrian monuments, and the character of those remains, go to show that the power and civilization of Babylon were earlier than those of Assyria. In Genesis x. 11 it is mentioned that Nineveh was founded by Asshur, but for long the country was subject to governors appointed by the kings of Babylon. We learn from monumental inscriptions that about 1820 B.C., when Asshur was the capital of the country, Samsi-vul founded temples there to Asshur, the great national deity, and to Anu and Vul, besides a temple to the goddess of Nineveh in the city of that name. The Assyrian rulers gradually began to treat with their southern neighbors on equal terms, the boundaries of the two countries were for a time clearly marked out, and intermarriages among the reigning families occasionally took place. About the latter end of the 14th century Shalmaneser acquired the whole of Naharain (the country round the sources of the Euphrates and Tigris) by conquest, and planted Assyrian colonies there; he also founded the city of Kalakh or Calah, and restored the great temple at Nineveh. About 1300 B.C. he was succeeded by his son Tiglath-ninip, who conquered the whole of the valley of the Euphrates, and built or restored the palace at Asshur. The five following reigns were occupied with wars, more or less successful, with the Babylonians. About the year 1120 B.C. Tiglath-Pileser I., one of the most eminent of the sovereigns of the first Assyrian monarchy, ascended the throne, beginning his reign by the conquest of the Syrians and Hittites in the west. He then carried his arms far and wide, subjugating the Moschians, Commagenians, Urumians, and other tribes in the north; on the south he shattered the Babylonian power, and captured their capital. But this empire, acquired and ruled by the energy and genius of one man, began to fall to pieces at his death (1100). The period of decline lasted over 200 years, during which time little is known of Assyrian history. Under Assur-nazir-pal, who reigned from 884 to 859 B.C., Assyria once more advanced to the position of the leading power in the world. The extent of his kingdom was greater than that of Tiglath-Pileser, and the magnificent palaces, temples, and other buildings erected during his reign, with their elaborate sculptures and paintings, prove that wealth, art, and luxury must have reached a high stage of development. When he ascended the throne Nineveh was the capital of the kingdom, but he restored and beautified Calah, which had suffered during the troubled and declining years of the country, made it his favorite residence, and raised it to the dignity of the chief city of the state. Among the first acts of his reign was the suppression of a revolt by the Assyrian colonists of Naharain (883). This was followed by the victorious campaigns in Zamua on the eastern frontier (882-881), against several rebellious provinces in the northwest (880), and against the Shukhi or Shuhites, who then occupied a tract of country between Babylon and Assyria (879). In another expedition he crossed the Euphrates and advanced to the Mediterranean, near the mouth of the Orontes. In 859 Assur-nazir-pal was succeeded by his son Shalmaneser II., whose career of conquest was equally successful. The closing years of his reign were troubled by the re-

ASSYRIA

bellion of his eldest son, Assur-dain-pal, who had gained over to his side the cities of Nineveh, Assur, Arbela, and other important towns. After much fighting the rebellion was put down by Shalmaneser's second son Samsi-vul (Samas-Rimmon), who succeeded to the throne in 824. The old dynasty came to an end in the person of Assurnirai II., who was driven from the throne by a usurper, Tiglath-Pileser, in 745, after a struggle of some years. No sooner was this able ruler firmly seated on the throne than he made an expedition into Babylonia, followed by another to the east in 744. In the following year an alliance was formed against Assyria between Sarduri, king of Armenia, and several neighboring princes, and the Syrians came to their assistance at Arpad, on the Euphrates. Here they were defeated with great slaughter by Tiglath-Pileser, and the Armenian king was chased to the gates of his capital, Turuspa. The conqueror now advanced against Syria, overthrew the ancient kingdoms of Damascus and Hamath, and placed his vassal Hosea on the throne of Samaria. A protracted campaign in Media (737-735), another in Armenia, and the memorable expedition into Syria mentioned in 2 Kings xvi., are among the most important events of the latter years of his reign. Tiglath-Pileser was one of the greatest of the Assyrians; he carried the Assyrian arms from Lake Van on the north to the Persian Gulf on the south, and from the confines of India on the east to the Nile on the west. Yet he was not able to keep his seat on the throne, being driven from it by another claimant named Shalmaneser (727). Little is known of the five years' reign of this prince. He blockaded Tyre for five years, and on the revolt of Hosea, king of Israel, in league with Sabako, king of Egypt, he invaded Israel and besieged Samaria, but died before the city was reduced. His successor Sargon (722-705) claimed descent from the ancient Assyrian kings. At the very opening of his reign, after taking Samaria and leading over 18,000 people captive, he overthrew the combined forces of Elam (Susiana) and Babylon. In 719 Sargon turned his arms against the revolted Armenians, and in 717 he besieged and took the rich trading city of Carchemesh, which had also risen against his authority; here an immense spoil fell into his hands. In 716 the Armenians and several tributary princes in the north again took up arms for independence, but the Assyrians having again triumphed the Armenian king committed suicide and the other princes submitted. The attitude of Babylonia now began to look extremely dangerous. Merodach-Baladan, a Chaldean leader, taking advantage of the troubles which closed the reign of Tiglath-Pileser, had possessed himself of Babylonia, and held it for 12 years, strengthening himself by alliances with Egypt and the various rulers of Palestine. In 710 Merodach-Baladan was driven out of Babylonia; in a single campaign the allies were crushed, Judah was overrun, and Ashdod leveled to the ground. Sargon spent the latter years of his reign in internal reforms, and in founding or beautifying several cities of his kingdom. A new city, called Dur-Sargina, was founded to the north of Nineveh, the library of Calah was restored and enlarged, and special attention was devoted to law reform. In the midst of these labors Sargon was murdered,

and was succeeded by Sennacherib, one of his younger sons, in 705.

No sooner was Sennacherib seated on the throne than he was compelled to take up arms against Merodach-Baladan, who had again obtained possession of Babylon. In 701 fresh outbreaks in Syria led him in that direction. He first swept down on Zidon, drove the king into Cyprus, and seated Tubal on his empty throne. Next he deposed Zidqa of Askalon, and advanced against Ekron and Judah. The people of Ekron had dethroned Padi their king, and gave him into the hands of Hezekiah, king of Judah. The Egyptian and Ethiopian forces advanced to the assistance of their Judean allies, but Sennacherib totally routed the confederates at Altaqa in Judah, which he rapidly overran, taking 46 of its fortified cities. Hezekiah now submitted, agreeing to pay the conqueror a sum of 30 talents of gold and 800 talents of silver. Padi was given up and restored to Ekron, and after Sennacherib had chastised the rebels he returned to Assyria. The threatening aspect of affairs in Babylonia and Elam again called his attention to the south in 700, and in 699 he advanced to the northern boundaries of his kingdom to quell the insurrections which had broken out among the hill tribes. His second expedition into Syria is one of the most memorable in the history of Assyria, and is briefly recorded in 2 Kings xix. But his career of conquest was stopped by an appalling catastrophe: his army lay before Libna, when in one night "the angel of Jehovah went out and smote in the camp of the Assyrians 185,000 men" (2 Kings xix. 35). Sennacherib himself returned to Assyria, and occupied the last years of his reign in repressing the outbreaks of the Babylonians and Elamites, in constructing canals and aqueducts, and in entirely rebuilding Nineveh. In 681 he was murdered by his two sons, Adrammelech and Sharezer, but they soon found themselves confronted by a veteran army under Esarhaddon, their father's younger and favorite son, who defeated them in a battle at Kanirabbat, and assumed the crown (680).

Esarhaddon fixed his residence at Babylon, where he governed in person during the whole of his reign. The most important event of this reign was the conquest of Egypt, which left Assyria the mistress of the world. In 672 Esarhaddon led his forces into Egypt, drove out Tirhakah, its Ethiopian ruler, and divided the land into 20 separate kingdoms, the rulers of which were his vassals. Feeling unable to cope in person with his rebellious tributaries, Esarhaddon associated his son Assurbani-pal with him in the government of the kingdom (669), dying two years later. But constant wars were beginning to exhaust the men and treasure of the empire; and luxury, which had flowed suddenly in like a flood, was enervating the people. The king now no longer appeared at the head of his army, but intrusted it to generals, and abandoned himself to indolence and sensuality. Assurbani-pal was a zealous patron of the arts; learned men from all countries were welcomed to his court; literary works were collected from all sources; the library of Nineveh was greatly augmented; the study of the dead language of Accad was encouraged, and dictionaries and grammars were compiled. The buildings were unrivalled for magnificence, his palace glittering with gold

ASSYRIA

and silver, and adorned with the rarest sculptures. Unfortunately the king's character was marked by cruelty and sensuality, and his example descended through the court to the people. He died in 625, and was succeeded by his son Assurebilili-kain, under whom Babylon definitely threw off the Assyrian yoke. The country continued rapidly to decline, fighting hard for mere existence until, under its last king Sarcus, Nineveh was captured and burned by the allied forces of the Medes and Babylonians in 606 B.C.

Ethnology, Language, Religion, etc.—The original inhabitants of Assyria and Babylonia belonged to that race variously called Turanian, Ural-Altaic, Scythian, or Tatar, and which appears at one time to have occupied the entire region from the Caucasus to the Indian Ocean, and from the Mediterranean to the delta of the Ganges. The ancient Assyrians, therefore, were of the same stock as that from which the Finns, Turks, and Magyars have descended; and their language, which has been preserved to us in inscriptions, and is known by the name of Accadian, is allied to the Ugro-Bulgaric division of the Finnic group of languages. The Akkadai or Accad race descended from the mountainous region of Elam on the east, and the origin of Chaldean civilization and writing was due to them. In course of time, however, a Semitic race of people spread themselves over the country, and mingled with or supplanted the original inhabitants, while their language took the place of the Accadian, the latter becoming a dead language. Belonging to the Semitic family, these later Assyrians were thus members of the same great division of the human race as the Hebrews, Syrians, Phœnicians, and modern Arabians. The language differed little from the Babylonian, which was characterized by a preference for the softer sounds and a fuller use of the vowels. Both languages retained traces of the influence of the earlier Accadian. Assyrian is closely allied to Hebrew and Phœnician; it has their peculiarities of phonology, vocabulary, and grammar, and some obscure points in Hebrew etymology have been cleared up by its aid. The language changed little throughout the 1,500 years during which we can trace its career in the recently deciphered inscriptions. It continued to be written with the cuneiform character down to the 3d century B.C. Assyria could boast of but little native literature; it was a land of warriors, and the peaceful arts had their home in Babylonia. It was not until the time of Assur-bani-pal that any attempt was made to rival Babylon in learning. Their original works were for the first time composed, and treaties were composed even, in the dead Accad language. The greater part of the literature was stamped in minute characters on baked bricks, but papyrus was also used, although no books in this form have come down to us. The subjects of the Assyrian literature comprise hymns to the gods, mythological and epic poems, and works on history, chronology, astrology, law, etc. (See BABYLONIAN LITERATURE.) The Assyrian religion, like the language and arts, was in most essential points derived from Babylonia. There were the same gods, the same ceremonials and prayers, and even the temples had the same names. There is, however, in one point a notable difference. In addition to the worship of the Babylonian deities the Assyrians adored their national deity Assur, plac-

ing him at the head of the Pantheon. He was called king of all the chief gods, the god who created himself, it being supposed that he was self-existent and the creator of all things. After Assur come the 12 chief deities, Anu, god of heaven, ruler of angels and spirits; Bel, the father of the gods; Hea, king of the sea; Sin, or the Moon, lord of crowns; Shamas, or the Sun, judge of heaven and earth; Ninip, god of hunting; Nergal, god of war; Nusku, bestower of sceptres; Beltis, mother of the gods; Ishtar, leader of heaven and earth; and Bel, or Mero-dach, lord of Babylon. Most of those divinities had consorts, who were not, however, admitted to the first rank of the gods. Below this first rank were a number of spirits, good and evil, who presided over the minor operations of nature. There were set forms regulating the worship of all the gods and spirits, and prayers to each were inscribed on clay tablets with blanks for the names of the persons using them.

Art and Science, etc.—Although in art, as in other things, Assyria was the pupil of Babylon, there was yet a notable difference between its development in the two countries, due partly to two causes. The alabaster quarries scattered over the country supplied the Assyrians with a material unknown to their southern neighbors, on which they could represent, far better than the Babylonians on their enamelled bricks, the scenes which interested them. Sculpture was naturally developed by the one, just as painting was by the other, and the ornamentation which could be lavished on the exterior of buildings in Assyria had to be confined to the interior in Babylonia. The Assyrian artists, faithful and indefatigable, acquired a considerable power in representing the forms of men and animals, and produced vivid and striking scenes of the chief occupations of human life. If they did not strive greatly after the ideal, and never in this direction reached a very exalted rank, yet even here their emblematic figures of the gods have a dignity and grandeur which implies the possession of some elevated feelings. But their grand merit is in the representation of the real. Their scenes of war and of the chase, and even sometimes of the more peaceful incidents of life, have a fidelity, boldness, and lifelike appearance which place them high among the realistic schools. Unlike that of the Egyptians, which remained comparatively stationary from the earliest to the latest ages, the art of the Assyrians is plainly progressive, becoming gradually more natural and less uncouth, more lifelike and less stiff, more varied and less conventional. It may be said to have reached its highest stage of development in the reign of Assur-bani-pal, when it was characterized by great chasteness and softness, delicacy and finish. The beginning of Greek art coincides with the decadence of the Assyrian, and there can be no doubt that the Hellenic artists owe much to their Assyrian predecessors. The advanced condition of the Assyrians in various other respects is sufficiently evidenced by the representations on the sculptures, and by the remains discovered among their ruined buildings. We now know that they understood and applied the arch; that they constructed tunnels, aqueducts, and drains; that they used the lever and the roller; that they engraved gems in a highly artistic way; that they understood the arts of inlaying, enamelling, and

overlaying with metals; that they manufactured porcelain, and transparent and colored glass, and were acquainted with the lens; that they possessed vases, jars, and other dishes, bronze and ivory ornaments, bells, gold earrings and bracelets of excellent design and workmanship. Their household furniture also gives us a high idea of their skill, taste, minuteness, and accuracy. The cities of Nineveh, Assur, and Arbela had each their royal observatories, superintended by astronomers-royal, who had to send in their reports to the king twice a month. At an early date the stars were numbered and named; a calendar was formed, in which the year was divided into 12 months (of 30 days each) called after the zodiacal signs, but as this division was found to be inaccurate an intercalary month was added every six years. The week was divided into seven days, the seventh being a day of rest; the day was divided into 12 *casbu* of two hours each, each *casbu* being subdivided into 60 minutes, and these again into 60 seconds. Eclipses were recorded from a very remote epoch, and their recurrence roughly determined. The principal astronomical work, called the *Illumination of Bel*, was compiled for the library of Sargon of Agane; it was inscribed on 70 tablets, and went through numerous editions, one of the latest being in the British museum. It treats, among other things, on observations of comets, the polar star, the conjunction of the sun and moon, and motions of Venus and Mars. The study of mathematics was fairly advanced, and the people who were acquainted with the sundial, the clepsydra, the pulley, and the lever must have had considerable knowledge of mechanics.

Government.—Like all the ancient monarchies which attained to any considerable extent, Assyria was composed of a number of separate kingdoms. In the East conquest has very seldom led to amalgamation, and in the primitive empires there was not even any attempt at that governmental centralization which we find at a later period in the satrapial system of Persia. The Assyrian monarchs reigned over a number of petty kings, the native rulers of the several countries, over the whole extent of their dominions. These native princes were feudatories of the Great Monarch, holding their crowns from him by the double tenure of homage and tribute. This system naturally led to the frequent outbreak of troubles. See CUNEIFORM WRITING; NINEVEH; NIPPUR.

Bibliography.—Botta and Flandin, 'Monuments de Ninivé' (1847-50); Layard, 'Nineveh and its Remains' (1849); Oppert, 'Histoire des Empires de Chaldée et d'Assyrie' (1866); Rawlinson, 'Five Great Monarchies of the Ancient World' (second edition, 1871); Lenormant, 'Lettres Assyriologiques' (1871-73); George Smith, 'Assyrian Discoveries'; 'Assyria'; and 'The Assyrian Eponym' (1875); Duncker's 'History of Antiquity' (1882); Sayce, 'Ancient Empires of the East' (1884); his 'Assyria: its Princes, Priests, and People' (1885), and his 'Fresh Light from the Ancient Monuments' (1886); Jastrow, 'Religion of Babylonia and Assyria' (1898); Maspero, 'The Dawn of Civilization' (1894).

Astarte, *as-tār'te*, Syrian goddess, probably identical with the *Semele* of the Greeks and the *Ashtaroth* of the Hebrews. According to

Lucian she had a very ancient temple in Phœnicia. She appears to have been regarded as the goddess of fruitfulness.

Astar'te, a genus of bivalve mollusks belonging to the family *Cyprinidæ*. They have 2-2 hinge teeth, and are suborbicular, compressed, thick, smooth, or concentrically furrowed shells. Tate estimated the recent species known at 20 and the fossil at 285. The former belong to the Temperate and Arctic zones, and the latter to the rocks from the carboniferous formation upward.

Astatic (*as-tat'ik*) **Needle** (Greek, "unstable," in physics, a magnetic needle whose tendency to set itself in the magnetic meridian has been nearly or quite neutralized in some way, so that while the needle retains its full magnetic power, it will remain indifferently in any position, even when quite free to turn. A magnetic needle may be made astatic in various ways; for example, by disposing magnets in the vicinity of the needle in such a way that their field of force opposes and neutralizes the earth's field. A commoner method is to make use of a pair of needles of equal size and equal magnetic strength, securing them together, one above the other, by a light, rigid connection, so that their lengths shall be parallel, and their poles turned in opposite directions. If the conditions here assumed are fulfilled rigorously, the system will have no directive tendency whatever. In practice it is quite possible to secure an adjustment so good that the directive tendency is masked by the torsional force of the suspending fibre. Astatic needles are used in the construction of delicate galvanometers, the coil conveying the current passing around only one of the needles of the system, or around both of them, in opposite directions. The full magnetic moment of the current is thus obtained, while the directive action of the earth's field remains practically zero, and the motion of the needle is opposed only by the torsion of the suspension. See GALVANOMETER.

Asten, *as'tên*, **Friedrich Emil von**, German astronomer: b. Köln, 1842; d. 1878. From 1870 he was employed at the Imperial Russian Observatory at Pulkowa. He will be best remembered for his work upon Encke's comet, the results of which were published in 1877, and included an elaborate discussion of all the appearances of this interesting body from 1819 to 1875.

Aster, *as'ter*, **Ernst Ludwig von**, German military engineer: b. Dresden, 5 Oct. 1778; d. Berlin, 10 Feb. 1855. His first service was in the Saxon army. Subsequently he entered the Russian service, and, soon after 1815, the Prussian. While in the last service he undertook the fortification of Coblenz and Ehrenbreitstein, and in 1842 was appointed general and inspector of all the Prussian fortresses.

As'ter, a genus of plants belonging to the natural order *Compositæ*, and comprehending several hundred species, mostly natives of North America although some of the species are found over most regions of the globe. The name is derived from the Greek *aster*, a star, and is due to the fact that the flowers (*capitula*) bear some resemblance to stars. The species are herbaceous plants, or more commonly

ASTERISK — ASTEROIDS

shrubs. On account of the large number of species composing this genus it is divided into six or seven groups, regarded by some botanists as forming distinct genera. Large as the genus is, it contains no species of any great utility in the arts, but many are cultivated as ornamental plants. The most beautiful species among those which are natives of Europe are the *A. alpinus*, *amellus*, and *pyreneus*, and among those of America, *A. grandiflorus*, *punicaeus*, *eminens*, *multiflorus*, *horizontalis*, *thyrsiflorus*, *roseus*, and *Novae Angliae*. The China aster (*A. chinensis*), introduced from China upward of a hundred years ago, is a well-known annual, growing to a height of from 12 to 18 inches, and bearing an abundance of large and beautiful flowers, exhibiting in the numerous varieties every hue except yellow, and a great diversity of marking. This plant lends itself readily to culture and florists are constantly adding new varieties to a stock that already numbers nearly 300. The French call this species *Reine Marguerite*. Some botanists refer it to a separate genus which they call *Callistephus*. The chrysanthemum and peony flowered varieties are particularly worthy of cultivation for the size, color, and abundance of their flowers. From the lateness of the season in which they bloom some species of aster have obtained the name in England of Christmas daisy. Of the species commonly cultivated in gardens, several bloom in July, and a few continue in flower from November until killed by frost, or the beatings of violent storms.

Asterisk ("a little star"), a sign or symbol (*) used in writing and printing, as a reference to a note at the bottom or on the margin of the page. The obelisk, or dagger (†), and many other marks, are similarly employed; but when there are several references on the same page, it is now common to use the numerals 1, 2, 3, etc. The asterisk often marks the omission of words or sentences, or it distinguishes words as conjectural or obscure, or it may be used merely as a typographical mark for any specified purpose.

Asterism, a property possessed by a few minerals of exhibiting star-like rays. It is due either to reflection of light from twinning lamellæ or minute enclosed tubes, as in the case of star-sapphire (q.v.), star-ruby, and star-quartz (q.v.), or to the regular arrangement of minute enclosed crystals as seen by transmitted light, in the case of some phlogopite or starmica.

Asteroidea, an order of *echinoderms*, the starfishes, so called because of their star-like shape. They are characterized by five or more arms, which they have the power to reproduce if broken off. Should one of these arms be entirely detached, taking a small portion of the body with it, a new fish will result.

Asteroids, a group of small planetary bodies, known also as minor planets, which revolve round the sun between the orbits of Mars and Jupiter. The most remarkable feature of these bodies is that they occupy a vacant place in the solar system in which a planet would naturally belong. Between the orbit of Mars, the fourth planet in order, and that of Jupiter the fifth, there is a space more than double the radius of the orbit of Mars itself. This gap was noticed from the time that the distances of the planets

were laid down by Kepler. It was long suspected that a planet would be found occupying it and an organized effort was made to discover it. The discovery of a planet which was supposed to be the long sought body was made by Piazzi, at Palermo, on the first day of the 19th century. To the great surprise of astronomers three other planets were found in the course of the next six years to be revolving in the same region. The smallness of the four bodies gave rise to the celebrated hypothesis of Olbers, that these bodies were the fragments of a single planet which had been disrupted by some cataclysm. Some 40 years elapsed when in 1846 a fifth asteroid was discovered. Others soon followed. More powerful telescopes were applied to the search, a thorough system was introduced, and in this way the number known went on increasing until it mounted into the hundreds and now a dozen or more are frequently added to the list in a single year.

When photography was applied to form a permanent picture of the stars in the sky, it was found that this method was the easiest by which discoveries of these objects could be made. Whatever method may be used, the difficulty of discovering an asteroid arises from the fact that it is impossible to distinguish such a body from a fixed star by its mere aspect. It can be detected only by its motion among the stars, and therefore requires that the same body should be observed at different times. But a photograph enables the motion to be detected in a very simple way, as follows:

If a telescope, mounted so as to serve as a camera, is pointed at a given region of the sky for half an hour or more, the images of the stars which fall on the plate remain immovable, and these bodies are photographed as simple points of light. But if an asteroid is in the field, its motion during the exposure is quite appreciable; and its picture appears as a short line, equal in length to the amount of motion during the exposure of the plate, which can be detected at sight. During the last ten years the number thus discovered has carried the total list up to more than 600, a number so great that it is almost impossible to compute the orbits or motions or even to find separate and appropriate names for the bodies.

The asteroids are distinguished from the major planets by several distinct and interesting features. One of these concerns their orbits. While the major planets, with the exception of Mercury, all move in nearly circular orbits, the orbits of the asteroids are, in the general average markedly eccentric. In some cases the asteroid is twice as far from the sun at aphelion as at perihelion. One result of this is that they appear several times brighter when seen in opposition at perihelion than at aphelion. The inclination of the orbits is also frequently very large. That of Pallas, one of the original four, is inclined no less than 34° to the elliptic. The result of this is that many of these bodies wander far outside of the limits of the Zodiac; indeed, in many cases they are seen north of the zenith in our latitudes when nearest the earth.

The size and mass of the asteroids do not admit of very accurate definition, for the reason that, with rare exceptions, they are seen in the telescopes only as points of light. Barnard, has, however, succeeded in measuring the apparent diameter of the first four, three of which are

ASTEROLEPIS

probably the largest of the group, with the great Yerkes telescope. The results are:

	Miles
Diameter of Ceres.	485
Diameter of Pallas.	304
Diameter of Vesta.	243
Diameter of Juno.	118

Only the largest shows a diameter exceeding one twentieth that of the earth, and all the others are much smaller than this. Judging from the amount of light they reflect very few of them are 100 miles in diameter and most of those known may not exceed 10 or 12 miles in extent. Indeed, we have reason to believe that as we take smaller diameters the number increases without any unit. The same remark might apply in a still greater extent to the masses. The latter are so small that the attraction of the whole mass of all the asteroids does not produce any effect that has yet been observed upon any planet or comet.

Of the total number of these bodies it is hardly possible to form any estimate, because the more powerful the means of research the more are found. We can hardly be astray in supposing that thousands exist, and if we include those that must forever remain invisible to us, the number must be countless. Yet they are all so minute that the total mass cannot be as great as that of the planet Mercury.

The hypothesis already mentioned, that these bodies are fragments of a great planet, has been effectually disproved by modern research. Apart from the impossibility of an explosion which would rend a planet, we have the fact that in the event of a disruption all the orbits would pass through a single point. It is true that this coincidence would not continue indefinitely, because the orbits would change their positions by the attraction of the other planets; but their size is found to be such that they could not originally have passed through any single point. The view now prevalent is suggested by the nebular hypothesis, which assumes that all the planets were at some remote epoch in the past spread out into rings of matter circulating around the sun. In the case of the eight major planets each ring condensed into a single body, but in the case of the asteroid ring it separated into countless small bodies instead of condensing into one. There is a curious grouping of the orbits which seems to have some connection with the origin of the whole collection. Thirty years ago it was noticed by Kirkwood that, if the orbits were arranged according to their mean distance from the sun, there would be gaps in the series at those points where the time of revolution was commensurable with the period of Jupiter. For example, there are no known asteroids having a period one third that of Jupiter, or one half or two fifths, although there are plenty of orbits within and outside these peculiar limiting values. The subsequent discovery of hundreds of these bodies has led to a slight modification of this law. The orbits not only seem to avoid these peculiar values, but to accumulate midway between them. To get an idea of the results suppose that every orbit stretched into a circle of a radius equal to its mean distance. Then treating these orbits as hoops, suppose that we arrange them all round on one centre. We should then find that the rings are divisible into four, five or six nearly distinct groups with vacant spaces between them. The most probable explanation seems to be that there were originally

five or six different rings of matter from which these bodies condensed, instead of a single ring as in the case of the larger planets.

Perhaps the most remarkable of the asteroids was one discovered in 1898. Some of its peculiarities have excited great attention on the part of the astronomical world. The orbits of all the other known asteroids are contained between the orbits of Mars and Jupiter, no known orbits approaching very near either of these planets. But, in the summer of 1898, Witt, of Berlin, found an asteroid which at perihelion came far inside the orbit of Mars, indeed within 14,000,000 miles of the orbit of the Earth. Its orbit was found to be extremely eccentric and, which was more curious, it was interlinked with that of Mars, so that if the orbits were rings, they would have passed through each other and hung together like two links. What gives this planet especial interest is that on these rare occasions when it comes nearest to the earth its parallax can be measured with greater precision than that of any of the other planets. It therefore affords us the best possible method of directly measuring the Solar system; but, most unfortunately, it is only once or twice in a century that the nearest approach will occur. What is most tantalizing, is that only six years before it was discovered, it is known to have passed at nearly the least distance from the earth, but it was then unseen by human eye. It was found to have been photographed a great number of times at the Harvard Observatory; but among the hundreds of stars whose images were found on the plate, its image was completely lost after the discovery in 1898. It was recognized through the determination of its orbit which made possible the computation of its position in the heavens at former positions. It was by scrutinizing the photographic plates that the images were found upon them.

In the winter of 1900-1 there was as close an approach to the earth as will occur during the next 30 years, although the distance was more than double the least possible distance. A co-operative effort was made to measure the parallax on this occasion. The results are not completely worked out, owing to the immense amount of labor which is required for the reduction of the observations.

A curious property of this most remarkable body is a periodical variation in its light which was noticed during the opposition of 1900-1. It was found to go through a series of changes in the course of five hours quite similar to those of a variable star. The period was found to be $2\frac{1}{2}$ hours, but possibly the same brightness was not reproduced except in a period of 5 hours. It was yet more curious that these variations seemed to have nearly or quite ceased at the next opposition.

SIMON NEWCOMB, LL.D.

Asterolepis, a genus of ganoid fishes named on account of the starry color of its scales. A bone of a species belonging to this genus, found at Stromness, the capital of Orkney, suggested to Hugh Miller the writing of his beautiful volume entitled 'Footprints of the Creator; or, the Asterolepis of Stromness.' It was an elaborate argument against the development hypothesis. According to that hypothesis, the first species of any class appearing on the scene should be low in organization, and probably small in size. Mr. Miller showed that the asterolepis was large in size and high in organ-

ASTHENIA — ASTOR

ization, and yet it was at that time believed to be the oldest fossil vertebrate found in Scotland. His argument was subsequently weakened by the discovery that the Stromness rocks were less ancient than the Forfarshire beds, containing cephalaspis and other fish genera subsequently discovered, mostly of small size, though not of low organization.

Asterophyllites, a genus of cryptogamous plants, allied to calamites, belonging to the order *equisetaceæ*. All are fossil, and belong to the carboniferous period. Their name was given on account of the starry appearance of the verticillate foliage, and their stems were articulated and branched.

Asthe'nia, a disease of poultry, known in the United States as "going-light." The treatment is purgation and tonics.

As'theno'pia. See EYE.

Asthma, as'ma, or az'ma, a disturbance of the function of breathing, sometimes due to heart or kidney disease, but properly an affection of the bronchi of a spasmodic character. It is regarded as a neurotic affection, characterized by turgor and hyperemia of the mucous membranes of the smaller bronchi and a peculiar mucus exudate. The causes of the attacks are many, but a nervous element seems to enter into most of them. The symptoms are those of tightness in the chest, depression, and followed by an attack of shortness of breath, attended with violent coughing. This may be very short in duration or the coughing may continue with great violence. The expression is anxious, the face pale, or cyanosed, as though choking was taking place; the patient cannot speak, inspiration does not aerate the blood, and expiration is long and wheezy. An attack may finally end with violent coughing and exhaustion. Asthma is more common in men than in women. It may be present even in children, in whom the family nervous inheritance is usually pronounced. The disease is usually chronic. The treatment is individual, the usual lines of dietetics, hygiene, training, with a few drugs. Iodide of potash is one of the most valuable of the remedies used. See 'Diseases of the Bronchi, Nothnagel's System' (1902).

Asti, as'te, a town of northern Italy, 28 miles east east-southeast of Turin. It is surrounded by dilapidated walls, and the streets, though wide, and possessing several noble mansions, have in general a mean and deserted appearance. The finest building is the cathedral, dating from 1348, and adorned with many excellent paintings. The trade is chiefly in wine and silk. Asti was in existence about four centuries before the Christian era. It was twice destroyed by the Gauls, and on the latter occasion was rebuilt by Pompey, who gave it its name. Alfieri was born here. Pop. (1901) 38,045.

Astig'matism, a term denoting a defect in the mechanism of the eye concerned with refraction. It interferes with the correct focusing at one point on the retina of all of the rays that come from a single point. One of the most frequent causes of this visual defect is the unequal curvature of the corneal surface, in its horizontal and vertical diameters, or in its seg-

ments. Nearly all eyes are slightly astigmatic and only in pronounced cases does it cause symptoms. Astigmatism is corrected by appropriate glasses. See EYE.

Astil'be, a genus of about eight species of hardy perennial herbs of the natural order *saxifragaceæ*, natives of Asia and eastern North America and often cultivated in shrubby borders for their showy masses of flowers which appear during summer. They closely resemble *aruncus* and *spirææ*, from which they are not readily distinguished by prominent characters, although they have eight or ten stamens and a 2-3 lobed pistil (twice as many as the petals), whereas in the two genera mentioned the stamens are numerous and the pistils several to many.

As'ton, William George, Irish philologist: b. near Londonderry, in 1841. He became interpreter and translator to the British Legation at Yedo, in 1870; assistant Japanese secretary at Yedo, in 1875-82; consul-general for Korea, in 1884; Japanese secretary at Tokio, in 1886; and was retired in 1889. He published 'A Grammar of the Japanese Spoken Language'; 'A Grammar of the Japanese Written Language'; 'A Translation of the Nihongi; or, Annals of Ancient Japan'; 'History of Japanese Literature,' etc.

As'ton Manor, an English manufacturing town in Warwickshire, forming a suburb of Birmingham. Pop. (1901) 77,310.

As'tor, John Jacob, American merchant: b. Waldorf, Baden, near Heidelberg, 17 July 1763; d. 29 March 1848. He came to America in 1783, where his elder brother had settled and invested his savings in the fur trade. In 1784 he went with a cargo of furs to London, sold them and formed connection with fur houses there, and as his capital increased, made annual trips to Montreal, buying furs there and shipping them direct to London, as Canada was allowed to trade only with the mother country. In 1794 Jay's treaty removed this embargo; and Astor, then in London, at once made a contract with the Northwest Company of Montreal and Quebec (then the magnate of the Canadian Northwest fur trade), imported furs from Montreal to New York, and shipped them to all parts of Europe and China. The surrender of the lake posts under the treaty also greatly extended the trading limits, and Astor in a few years became one of the leading merchants and capitalists of the country, having a quarter of a million in 1798, and double that a few years later. In 1807 he embarked in direct trade with the Indians by way of the Mohawk, and with the English fur companies; but found the American trade chiefly monopolized by the Mackinaw Company, and knowing our government's desire to keep its home trade in home hands, proposed with its protection to accomplish this himself. In 1809 he secured a New York charter for the "American Fur Company," but the War of 1812 suspended operations, and after it a government prohibition of British fur trade in the United States broke up the company. Meantime a grander scheme had been initiated. Sir Alexander Mackenzie, after crossing the Continent far north in 1793, had suggested establishing a line of trading posts from ocean to

ASTOR

ocean, with terminal, coast, and island stations, to draw all except the Russian fur trade into one channel. Lewis and Clarke's transcontinental American expedition in 1804 proved its practicability on American soil; and Mr. Astor evolved the plan of distributing such posts along the Missouri and Columbia Rivers, with a central station at the mouth of the latter, where all the peltries from the interior posts and those gathered by coasting vessels were to be collected, and taken by a yearly ship to Canton, loading in return with Chinese goods. A later development was to operate a line of ships from the Pacific coast to the Chinese and East Indian ports, with a Hawaiian island for an intermediate port. The Russian fur company had already complained to the United States of the casual American trading vessels selling liquor and firearms to their Indians; our government had consulted Astor for a remedy, and his idea was to abolish this irresponsible trading by making his yearly supply ship take its place. To prevent ruinous competition, he offered the Northwest Company a one third interest in the enterprise; but they declined it, and sent a company to seize the mouth of the Columbia before his party could arrive. He succeeded in spite of them, however, in planting a settlement, which was named Astoria; but on the breaking out of the War of 1812 the English seized it. It reverted to the United States by the Treaty of Ghent, and Astor wished to revive the project, but the government was cool, and he dropped it; still, however, buying his furs direct and trading with many countries, more particularly China, at that time the best fur mart in the world. He also made large amounts by buying depreciated government securities, which afterward commanded a considerable premium. But his chief investment was the one which has founded the family greatness on a rock. Foreseeing the immense growth of New York city, he bought large tracts on Manhattan Island far beyond the then city limits, taught his son to invest his accumulations in the same way, and established the system of handling them described under **ASTOR FAMILY**. In 1827 he and his son William, who had been his partner since 1815, withdrew from the China trade and formed the American Fur Company, chiefly managed by the great expert; but a few years later he retired from business altogether, thenceforth devoting himself to his investments, and devising, in consultation with others, plans for a public library suggested by Washington Irving, — afterward the Astor Library, for which he left \$400,000 in his will. He made gifts and bequests to other objects; among them \$50,000 for a school for poor children and a home for the indigent aged in his birthplace, Waldorf, called the Astor House. He was much more than a great trader: he had a breadth of conception, a combined energy and patience of execution, a mastery of detail, a retentiveness of memory, and a sagacity of judgment, which in the judgment of his intimates would have raised him to greatness in any line. He left two sons, William B. and John Jacob, and three daughters.

As'tor, John Jacob, an American capitalist and soldier, son of William B.: b. New York, 10 June 1822; d. 22 Feb. 1890. He was educated at Columbia University and at Gottingen; he then

took the full course at the Harvard Law School, and practised law for a year, solely to qualify himself for assisting in the management of the immense estate, one half of which later descended to him. In the Civil War he served on McClellan's staff, with the rank of colonel; and was a devoted and hard-working military student. He always regarded this period as the best of his life, and attended the reunions of the Loyal Legion with zeal. Not only was he always a liberal giver to public institutions and charities, but he gave much personal time and devotion to them, especially to the Astor Library and Trinity Church; but he shrank from public notice. On his father's death in 1875 he received half of the estate, estimated at considerably over \$100,000,000; all which, with accumulations believed to have swollen it to some \$200,000,000, he left to his only son, William Waldorf Astor. His wife, Charlotte Augusta Gibbs, was an active assistant in his charitable work, taking part in personal service as "Sister Augusta," incognito.

As'tor, John Jacob, American capitalist and inventor, fourth of the name, nephew of John Jacob the third, and son of William: b. Rhinebeck, N. Y., 13 July 1864. He graduated from Harvard in 1888, and for the next three years traveled abroad. He is the manager of the Astor properties in America; a director in many banking, insurance, and railroad companies, and member of various clubs and social organizations. He built in 1897 a very costly hotel, the Astoria (named after the famous fur settlement of 1811), on Fifth Avenue, New York, adjoining the Waldorf built by his cousin, William Waldorf, the two being now joined as the Waldorf-Astoria. Besides his business activities, however, he has strong individual faculties. He is an expert in marine mechanics, inventor of a bicycle brake, and a pneumatic road improver; and is a member of scientific and other intellectual societies. He has written 'A Journey in Other Worlds a Romance of the Future' (1894). He was on Gov. Morton's staff 1894-6, and in the Spanish-American war of 1898, was commissioned lieutenant-colonel of United States Volunteers, and served in the Santiago campaign.

Astor, William Backhouse, American merchant and capitalist, eldest son of John Jacob Astor: b. New York, 19 Sept. 1792; d. 24 Nov. 1875. He was trained in his father's business in the intervals of public school education; and the father is said to have remarked that "William would never *make* money, but would keep what he had." At 16 he was sent to Heidelberg University, and at 18 went to Gottingen, where he was tutored by Bunsen, afterward the great chevalier. Returning to New York in 1815, he was made a partner in his father's foreign shipping trade, especially cultivating the Chinese field. The firm was John Jacob Astor & Son till 1827, when it dissolved and both partners gave up the China trade to form the American Fur Company, of which William was president, but John Jacob the head manager till he withdrew from active business life a few years later. He was shortly followed into retirement by his son. By 1848 he had amassed a fortune of his own; besides receiving a legacy of half a million from his uncle Henry, and a gift of the Astor House

ASTOR—ASTORIA

from his father; the latter on his death in that year leaving him sole legatee save for minor bequests, the property being estimated at \$20,000,000 to \$30,000,000. His life thenceforth was spent in conserving and developing this. He built nearly a thousand houses on his uptown lots, and was currently termed "the landlord of New York." He was also a heavy investor in other lines, notably coal and railroad stocks. He founded the Astor Library under his father's bequest, adding by gifts and bequests over \$600,000 to his father's gift, giving much time to its administration from the completion of the building in 1853 on his plans. His wife was the daughter of Madison's second secretary of war; his sons were John Jacob and William, and the estate was shared between them.

Astor, William Waldorf, an American capitalist, son of John Jacob the third: b. New York, 31 March 1848. He is the head of the chief Astor estate. He was educated by private tutors; studied law to qualify himself for the management of his estates, and assumed it in 1871. He was elected to the New York State lower legislative chamber in 1877, and to its Senate in 1879; and was an unsuccessful candidate for Congress in 1881. In 1882 he was appointed minister to Italy by President Arthur, and remained such till 1 March 1885. He made literary capital out of this in 'Valentino' (1885) and 'Sforza' (1889). He succeeded by his father's death in 1890 to a fortune estimated at some \$200,000,000, and the same year removed to London. Shortly afterward he built the famous and costly New York hotels, the New Netherland and the Waldorf. In 1893 he bought the 'Pall Mall Gazette' and founded the 'Pall Mall Magazine,' and in 1899 took the oath of allegiance as an English subject.

As'tor Family, a famous American family representing one of the three or four greatest private properties in the world. A family in the Old World sense,—a territorial aristocracy, impossible to destroy, and fortified with legal immunities and privileges,—can hardly be founded in America; but the Astors have approached it as nearly as our institutions will admit. They form a group of immense hereditary real-estate owners, with holdings so solidly based and well distributed in the metropolis of America that no apparent catastrophe save a failure of heirs could extinguish it; and though originally springing from mercantile business, removed by some three quarters of a century from its actual conduct. For many years they were known as "the landlords of New York," and the best of landlords, prompt, just, and courteous; still probably form the largest set of individual real-estate holders. The family is also connected with notable municipal charities and public foundations. See **ASTOR, JOHN JACOB** (1763-1848); **ASTOR, JOHN JACOB** (1822-90); **ASTOR, JOHN JACOB** (1864-); **ASTOR, WILLIAM**.

Astor Library. See **NEW YORK PUBLIC LIBRARY**.

Astor Place Riot, in American history: a riot on the evening of 10 May 1849, in Astor Place, New York. It was an attempt to drive the English actor, William Charles Macready (q.v.) from the stage, and grew out of a London tour of Edwin Forrest (q.v.), in which he

played *Virginius* and *Richelieu* with great success till Macready bought the acting rights for himself, though he had personally treated Forrest with kindness. Forrest then essayed *Macbeth*, but it was unsuited to his style and presence, and he was hissed. He attributed this to Macready's machinations, and when Macready four years later announced 'Macbeth' in the Astor Place Opera House, a crowd of Forrest's partisans gathered early in the evening before the theatre, and waiting till the performance had begun, attempted to force a way inside and put a stop to it. The police were powerless and sent for the military; the Seventh Regiment (New York militia) came up, and was assailed by the mob with showers of brickbats and stones. Before the fray was ended, 34 rioters were killed, a great number wounded, and 141 of the regiment injured by the missiles. The mob was successful in its purpose, however: Macready had to cancel his engagement, conceal himself in a private house for a couple of days, and then travel secretly to Boston, whence he sailed for England. See Barrett, 'Edwin Forrest' (1882).

Astor'ga, Emanuele d', an Italian composer: b. Palermo, 11 Dec. 1681; d. 21 Aug. 1736. He was educated in a monastery in Astorga in Spain, from which he afterward took his name. A 'Stabat Mater,' which he is said to have written in London, is considered the best of his works, and is still highly regarded.

Astorga, as-tör'ga, a city in Spain, the *Asturica Augusta* of the Romans. It figured prominently during the Peninsular war; was taken by the French after an obstinate defense, 1810; and retaken by the Spaniards, 1812. It is the see of a bishop. Pop. 5,000.

Astoria, Or, a city, port of entry, and seat of Clatsop County: on the Columbia River, nine miles from its mouth, and 101 miles by the Astoria & C. R. R.R. from Portland. Several foreign steamship lines touch here, the largest vessels coming up to its five miles of water frontage through the deep, broad channel scoured in the bar at the river mouth by a jetty. Its salmon fishing and canning industries are among the greatest in the world: several hundred boats go out to the fishing grounds on the bar every afternoon during the season of about 100 days, some 1,500 in all being employed; and the canneries utilize some \$2,000,000 capital, and turn out about 15,000,000 cans a year. It has also subsidiary can manufactories and iron works, great lumber works from the vast forests of the Pacific slope, flouring mills, breweries, etc.; and has a very large export trade in the special products of Oregon and Washington—lumber, wheat, oats, live stock, wool, potatoes, apples, etc. Among its buildings, the most notable are the United States custom-house, the post-office, and St. Mary's Hospital (R. C.). For the founding of Astoria in 1811, see **ASTOR, JOHN JACOB**. On its seizure by the English in the War of 1812, they renamed it Fort St. George; in 1818 it was restored to the United States, though occupied till 1845 by the fur stations first of the Northwest Company, then of the Hudson Bay Company with which the former consolidated. It received a city charter in 1876. Pop. (1900) 8,381.

Asto'ria, or **ANECDOTES OF AN ENTERPRISE BEYOND THE ROCKY MOUNTAINS**, a rambling

ASTRABAD — ASTRO-PHOTOGRAPHY

work by Washington Irving (1836). It comprises stories of expeditions by land and sea, and as a chapter of Far West history, does not lose its value by the lapse of time.

Astrabad, às'tra-bad', a town of Persia, about 30 miles east of the Caspian Sea. It carries on a trade in horses, sheep, cotton, silk, woolen fabrics, etc., and is connected by caravan with Afghanistan and is the seat of a Russian consulate. Pop. estimated at from 4,000 to 10,000.

Astræa, in mythology, the daughter of Zeus and Themis, and goddess of justice. In the age of gold she was a regular inhabitant of this world; in the age of silver an occasional visitor; and in the age of brass, when men began to forge weapons of war, fled to the skies, where she is seen in the zodiac, forming the constellation Virgo. She is usually represented with scales in her hand and a crown of stars on her head.

Astræ, **The Divine**, a name applied to the English novelist and dramatist, Mrs. Aphra Behre, who was noted for the coarseness of her plays. "The stage how loosely doth Astræa tread."

As'tragal, in architecture, a small semi-circular molding, with a fillet beneath it, encircling a column and separating the shaft from the capital.

As'tragaloman'cy (Greek *astragalos*, in the plural = dice, and *mantia* = divination), a pretended divination performed by casting down dice with marks corresponding to letters of the alphabet, and observing words thus formed. It was practised in the temple of Hercules, in Achaia.

Astragalus. See **Foor**.

Astrag'alus, **Milk Vetch**, a genus of more than 1,000 species of hardy leguminous herbs and under shrubs which, except in Australia where they have not been found, are of world-wide distribution on dry soils. *A. gummifer* and other species yield tragacanth (q.v.) gum. Certain species native to the western United States called crazy weeds (q.v.) are considered responsible for crazy disease of stock. The leaves are usually pinnate; the flowers arranged in racemes, white or purple. A few native and foreign species are grown from seed for ornamental purposes. They succeed best on dry, porous soil in sunny situations.

Astrakhan, às'trakhân', a government in the southeast of European Russia, on the Caspian; with an area of about 92,000 square miles. It consists almost entirely of two vast steppes, separated from each other by the Volga, and forming for the most part arid sterile deserts. The live stock consist chiefly of sheep of the broad-tailed species. The chief employments are pasturage and fishing—the former occupying the rural and nomadic tribes, and the latter the tribes on the Caspian coast and the banks of the Volga. Pop. (1897) 994,775.

As'trakhan', the capital of the Russian government of the same name. It is situated on an elevated island in the Volga, about 30 miles above its mouth, and consists of crooked, dirty, but broad streets, with irregular lines of houses. The communication with the opposite banks of the river is maintained by numerous bridges.

The most important edifice is the cathedral, of a rectangular form, with four small gilt and painted cupolas on the roof, and a large one in the centre. The manufactures, consisting of silks, cottons, woollens, shagreen skins, morocco leather, and soap, are increasing in extent. The fisheries furnish the staple articles of trade. Immense quantities of fish, caviar, and isinglass are exported to foreign countries. In the fishing season from 20,000 to 30,000 persons connected with the fisheries frequent the city. It is the naval station of the Caspian fleet; is the most important port of the Caspian, and has regular steam communication with the principal towns on the shores of that sea. Pop. (1897) 113,001.

As'trakhan', a name given to sheep-skins with a curled woolly surface obtained from a variety of sheep found in Bokhara, Persia, and Syria, and also to a rough fabric with a pile in imitation of this.

As'tral Spir'its, spirits believed by the Greeks and Orientals to inhabit the heavenly bodies or the aerial regions. In the Middle Ages they were variously conceived as fallen angels, souls of departed men, or spirits originating in fire, and belonging neither to heaven, earth, nor hell. Paracelsus regarded them as demoniacal in character.

As'trapothe'rium, an extinct hoofed animal found in the Miocene formations of Patagonia. It is unlike any modern animal, but is distantly related to the extinct Toxodonts of South America. It was as large as a rhinoceros, had large tusks opposing each other in the upper and lower jaws, and a broad flexible muzzle like that of the hippopotamus, or possibly a short proboscis like that of the tapir.

Astringents. Substances that have the property of precipitating albumin and other proteids act as astringents. When used on mucous membranes they contract the tissues, diminish the blood supply, decrease the mucus and modify the sense perceptions in the part. In the mouth they cause the well-known sensation of puckering. Their action is purely local. Vegetable astringents all contain tannic acid, to which substance their action is due. Nearly all of the mineral salts are astringent when used well diluted with water. In concentrated solution their coagulant action is so pronounced as to cause death of the tissue (caustic). The astringents are particularly serviceable in stimulating atonic mucous membranes, causing them to secrete less mucus. They are thus useful in chronic diarrhœas, in leucorrhœa and in mucous discharges from other parts of the body. The most serviceable of the vegetable astringents is tannic acid, or its compounds, tannalbin, tannigen, and related bodies. Of the mineral salts, solutions of copper sulphate, zinc sulphate, lead acetate and the aluminum salts are the most useful.

As'tro-photog'raphy. It seems likely that attempts to photograph the moon were made by Daguerre in the course of the experiments which led to the first successful method for making optical images permanent. Certainly in 1840 Draper, of New York, obtained a crude and imperfect picture of the moon, after a prolonged exposure of the Daguerreotype silver plate. In 1851, and the years immediately following, the collodion wet-plate process was introduced and

ASTRO-PHOTOGRAPHY

developed. By this method De la Rue, Draper, and Rutherford were enabled to produce pleasing photographs of the moon. Much advance was made, during the same period, in the application of photography to other celestial objects, but it cannot be said that the results, on the whole, were other than interesting and suggestive. Obviously, however, the work was full of promise of better things, and the modern developments along this line afford an impressive illustration of the growth of a scientific toy into a potent instrument of research. In the early seventies the gelatine dry-plate became generally available, and from that time astronomical photography has steadily grown in effectiveness and applicability. In outline, astronomical photography is like any other photography. By means of a suitable lens an optical image of whatever is to be photographed is thrown upon the sensitive plate. It is immaterial whether the object be a landscape, the moon, an animal, or a constellation. After an exposure whose duration is determined by experience, the plate is removed and "developed" by any of the well-known processes. The result is a reproduction, in light and shade, of the optical image. From this plate, called a "negative," may be made prints, transparencies, etc. The obstacles met with, however, in carrying out this apparently simple process when applied to celestial objects, are many and great. On account of the rotation of the earth, the heavenly bodies are seemingly in motion from east to west. Some of them, moreover, have sensible motions of their own. Thus it is necessary to provide compensating motions for the camera or photographic telescope so that the image shall remain in the same place on the plate during exposure. This is a mechanical problem of great difficulty. Again, the camera must be used from the bottom of a deep atmospheric ocean turbid with smoke, dust, ice-crystals, and vapors, and swirling with currents and eddies. This obstacle is the most serious one in all astronomical work. It becomes more and more disastrous as the magnifying power of instruments is increased, and is but imperfectly overcome by careful selections of sites for observatories, and of times for work when the air is relatively quiet. There are many other difficulties which attend the processes of practical astronomical photography, but these two are fundamental. On the other hand, there are at least two fundamental advantages in the photographic method as compared with the direct visual method of studying the sky. When measurements are to be made—such as, for example, the measurement of the angular distance between two neighboring stars—the direct method often calls for careful, accurate work under trying conditions. The observer may be hurried, in a constrained attitude, or shivering with cold. Checks by a second observer may be of doubtful value on account of personal equation or changed conditions. If, however, the two stars be photographed on the same plate, the measurements may be made at leisure, in physical comfort, and with every precaution for insuring accuracy. In the second place, the effect of light-vibrations upon the sensitive substance of the photographic plate is cumulative. That is the longer the plate is exposed the greater the effect of the light upon it. (There is, no doubt, a maximum, but it lies outside the range

of photography.) Upon the retina of the human eye, however, or upon the optic nerve, there is no such cumulative result. We gain nothing by looking for a long time toward an object whose light is too feeble to affect the sense of vision. When, after a while, we see an object not previously discerned, it is because the attention is directed to it, not because the retina is more affected.

It is on account of this property of the photographic plate that prolonged exposures have revealed faint objects or peculiarities of structure, not visible to the keenest eyes aided by the most powerful telescopes. As an important though subsidiary advantage of the photograph, may be mentioned the possibility of presenting to the sight enlarged representations of relatively extensive celestial areas. The field of vision of a great telescope is very small. A photograph of a nebula or of a star-cluster, projected by a fine lantern, at once exhibits a convincing general view, revealing things in structure and arrangement which might long escape the notice of one studying the object with a telescope. The difference is much the same as that between a broad view of a landscape and the same examined through a long tube of small diameter. Photography is at present employed in almost every line of astronomical research. The general divisions of the subject are, however, indicated in what follows.

Star Charts—By agreement among the authorities of some score of observatories in different parts of the world, there has been undertaken the enterprise of photographing the entire heavens. The plates are of uniform size, and the lenses used are as nearly as possible identical in figure. One set of photographs is to include stars down to the eleventh magnitude, while a second set is to include everything that can be secured by the longest practicable exposure. The value of the resulting charts to the astronomy of the future can scarcely be overestimated. Had such a map been constructed a few centuries ago it would now throw great light on problems relating to the structure of the universe. Meantime the study of the photographs already secured has been of importance in modifying theories as to the distribution of the stars, in revealing asteroids, new stars (so called), and variable stars.

Photographs for Detail.—Up to the present time the greatest success in this line of endeavor has been attained in photographing the moon, the sun, and nebulae. The superb lunar photographs produced at the Lick Observatory and at the Observatory in Paris leave little to be desired, although they are inferior to the best views obtained by the direct use of the telescope. These wonderful pictures cannot fail to be of great future value in showing to what extent, if at all, changes take place on the surface of our satellite. The photographs of the sun are, thus far, somewhat less satisfactory as to minute details. The air between the observer and the sun is almost constantly disturbed, and it is not easy to take advantage of instants of "good seeing" for securing the pictures. Nevertheless the accumulations of solar photographs, taken as they are every day, constitute a most admirable history of what goes on in the sun's surface and help toward a correct understanding of solar physics. At recent total solar eclipses many

ASTRO-PHOTOGRAPHY

thousands of photographs of the corona have been secured. These naturally differ widely in scientific value, but it must be admitted that the best of them fall short of revealing all that is seen by the eye. The "fogging" of the plates from the light in the atmosphere in the solar direction obscures the image of the outer corona. The eye recognizes this faint extension rather by its tint than by its luminosity as compared with that of the sky. Photographs of the nebulae, on the other hand, taken by prolonged exposures on moonless nights, have greatly advanced our knowledge of the structure of these objects, and have led to modifications in the statement of the nebular hypothesis. Photographs of the planets have thus far failed to give satisfactory results in exhibiting surface markings.

Photographs for Measurement.—Aside from the construction of star-charts as described above, the photographic method is used in an increasing number of cases in which the most accurate angular measurements are desired, and is now fairly comparable with the heliometer method. Among the more important applications of the new process is the determination of parallax by photographing Mars when near the eastern horizon and again when near setting; the rotation of the earth, meantime, having carried the observer from one end to the other of a base-line whose length depends upon the latitude of the station and the time between the exposures. Precisely the same method was applied to the newly discovered asteroid Eros during the latter part of the year 1900. It is clear that the difference in place of the planet among the stars, when the eastward picture is compared with the westward, is due to parallax, allowance being made for the movements of the planet and the earth during the interval between the observations. A similar method may be used in investigations of stellar parallax, the photographs being taken at half-yearly intervals, thus securing a base-line nearly or quite equal to the diameter of the earth's orbit. Photographs of stellar spectra afford a means for detecting and measuring the motion of stars in the line of sight by noting the displacement of the lines toward either end of the spectrum. Through investigations of this sort it has come to be believed that there are many large, dark stars associated with visible stars, constituting, in some cases, systems of great complexity. The existence of such a dark body is inferred from the alternate approach and retreat of the visible star, relatively to the earth, this motion being apparently due to a revolution of the bright star about, or with, an invisible companion. In some cases, also, the periodic duplication of the spectral lines seems to indicate that a star is double, both components giving out light, while the largest telescopes fail to resolve the pair to the vision.

Photometry.—With a given time of exposure the size and blackness of the stellar images are proportioned to the brightness of the stars. This fact renders it easy to prepare lists of stars in order of brightness or "magnitude." The method is the less valuable, however, for the reason that the color of a star influences the chemical effect of its light upon the plate. A bright red star gives a smaller image in a given time than a fainter white or blue star. A complete photo-

metric classification of the stars should be based upon measurements of the intensity of several portions of their spectra.

Transits, etc., by Photography.—By mechanical means it has been sought to eliminate the personal equation by photographing a star and the reticle of a transit or similar instrument at intervals automatically measured and recorded by clockwork. This must be taken as a very general statement of a method which, in a variety of forms, may yet be developed to a high degree of usefulness.

Instruments for Astronomical Photography.—It is well known that the lens of a visual telescope is quite unfit for photographic work. Those portions or components of white light that are best for seeing are not the components most effective in producing the negative. The blue and violet rays, left outstanding in the chromatic correction of the ordinary telescope, are precisely the ones wanted in photography, and they confuse and spoil the negative when the visual lens is tried as a photographic lens. Hence there must be a special objective for use in photographing, or an auxiliary lens for transforming the visual objective for its new work. So-called "portrait" lenses are much in use when a short focus, with large field and small images, is required. Lately much progress has been made in the use of mono-chromatic plates covered by colored glass screens, for absorbing the light that is not wanted. In this way it is possible to do good work in certain lines without a special lens. The accurate pointing of the telescope or camera is a matter of extreme difficulty, especially during long exposures. No driving clock yet produced, even when controlled, through electric devices, by the standard time-piece, is quite satisfactory. Therefore, it is necessary, in very many cases, that two telescopes, one visual and one photographic, should be bound together, and that an observer should keep the pair accurately pointed by hand. This is a most delicate operation, calling for great power of concentration, and for special deftness of touch. The observer, with eye at the visual telescope, keeps the cross-hairs of the eyepiece precisely upon a selected star. He watches and modifies the rate of the driving clock, moves the telescope as atmospheric refraction varies, and seeks in general to prevent all motion of the image on the plate. Upon the successful accomplishment of this difficult undertaking depends the final value of the photograph. In certain classes of work, however, the stars are allowed to "trail" a little, so that their images may readily be distinguished from specks and imperfections in the plate. The "coudé" telescope is much favored in Europe for photography, on account of the great steadiness of the eye-end and the comfort afforded the operator. In this country, when long-focus lenses are to be used, the tendency is toward the fixed horizontal telescope, a detached siderostat reflecting the light from the object into the telescope.

Among the more important adjuncts in instrumental devices should be mentioned the beautiful machines for measuring distances on the photographic negatives, this apparatus taking the place of the micrometer eyepieces used for direct measurements with the telescope.

F. S. LUTHER.

ASTROCARYUM—ASTRONOMY

As'trocar'yum, a genus of about thirty species of tropical American pinnate-leaved palms noted for their profuse sharp spines sometimes a foot long. *A. murumuru*, the murumuru palm, a common species in the lower Amazon region, seldom attains a height of more than 20 feet. It bears an edible, melon-flavored, musky-scented ovate fruit about an inch long, the pulp of which is highly prized as food for man and cattle. Hogs crush the seeds, which are almost as hard as vegetable ivory, and fatten well upon them. *A. tecuma*, the tecuma palm, reaches a height of 30 to 40 feet, and has very regularly arranged spines, bears an edible, globular fruit, and is native of the same region as the preceding species. *A. vulgare* is a taller-growing palm than the above. The unexpanded leaves furnish a strong fibre, for which the tree is often cultivated where it is not native. To obtain this fibre the terminal bud is cut and the epidermis of the delicate leaves carefully peeled in ribbon-like strips that when dry are twisted into fine, strong durable threads used for making twine, bowstrings, hammocks, fish-nets, etc. The fibre of older leaves is coarser, tougher, and stronger, and is used for cordage; the petioles of the young leaves are used for making into baskets and hats. This species, commonly known as the tecum palm, is distinct from the tecuma palm noted above, but was confounded with it by Maritius, who pictured the tecuma as the fibre-bearing species. Consult: Wallace, 'Palm Trees of the Amazon' (1853). Several species are cultivated in greenhouses for ornamental purposes and specimens as large as 10 feet tall often bear fruit. For culture, consult: Bailey and Miller, 'Cyclopedia of American Horticulture' (1900-2).

As'trolabe (from Greek *astron*, a star, and *lambano*, I take), the name given by the Greeks to any circular instrument for star measurement. In modern astronomy this instrument is no longer used, because wholly superseded by the sextant. The first application of the astrolabe to navigation was made by the physicians, Roderich and Joseph and Martin Behaim of Nurnberg, when John II., king of Portugal, desired them to invent a method of preserving a certain course at sea. Angles of altitude were found by suspending the astrolabe perpendicularly.

Astrology, the science which pretends to foretell future events, especially the fate of men, from the position of the stars. Originally, that is, among the Greeks and Romans, the word had the meaning of "astronomy," and, as in the case of alchemy and chemistry, the pseudo-science and the real science had the same origin. In early times, when the earth was regarded as the centre of the universe and as that to which all else was somehow tributary, it was a not unnatural hypothesis that the changing configurations of the heavenly bodies might be indicative of human destiny, or might influence human character. Hence, the Chinese, the Egyptians, the Chaldeans, the Romans, and most other ancient nations, with the honorable exception of the Greeks, became implicit believers in astrology. It was partly the cause and partly the effect of the prevalent worship of the heavenly bodies. The "star-gazers," sarcastically referred to in Isa. xlvii. 13, were perhaps astrolo-

gers; so also may have been what are called in the margin "viewers of the heavens"; but the Hebrew word rendered "astrologers" in Dan. i. 20; ii. 2, 27; iv. 7; v. 7, is a much vaguer one, meaning those who practise incantations, without indicating what the character of these incantations may be. The later Jews, the Arabs, with other Mohammedan races, and the Christians in mediæval Europe were all great cultivators of astrology. Some of the greatest astronomers, among whom was John Kepler, who knew very much better, were accustomed to "cast horoscopes," and to receive large fees for so doing. The ordinary method of procedure in the Middle Ages was to divide a globe or a planisphere into 12 portions by circles running from Pole to Pole, like those which now mark meridians of longitude. Each of the 12 spaces or intervals between these circles was called a "house" of heaven. The sun, the moon, and the stars all pass once in 24 hours through the portion of heavens represented by the 12 "houses." Every house has one of the heavenly bodies ruling over it as its lord.

The houses symbolize different advantages or disadvantages. The first is the house of life; the second, of riches; the third, of brethren; the fourth, of parents; the fifth, of children; the sixth, of health; the seventh, of marriage; the eighth, of death; the ninth, of religion; the tenth, of dignities; the eleventh, of friends; and the twelfth, of enemies. The houses vary in strength, the first one, that containing the part of the heavens about to rise, being the most powerful of all; it is called the ascendant, while the point of the ecliptic just rising is termed the horoscope. The important matter was to ascertain what house and star was in the ascendant at the moment of a person's birth, from which it was deemed possible to augur his fortune. It followed that all people born in the same part of the world at the same time ought to have had the same future, an allegation which experience decisively contradicted. Even apart from this, astrological predictions of all kinds had a fatal tendency to pass away without being fulfilled; and when, finally, it was discovered that the earth was not the centre of the universe, but only a planet revolving around another body, and itself much exceeded in size by several of its compeers, every scientific mind in Europe felt itself unable any longer to believe in astrology, which has been in an increasingly languishing state since the middle of the 17th century. It still flourishes, however, in Asia and Africa, and is a means of livelihood to many charlatans who prey upon the ignorant classes in all countries.

As'tronom'ical and As'trophysi'cal Society of America, a national society whose members must possess technical knowledge of astronomical and astrophysical science. Membership (1903) 180.

Astronomy. Astronomy is that branch of science which treats of the heavenly bodies—including practically all the bodies of the universe. The great advance which our times have witnessed in the methods of research has made it one of the most progressive of the sciences, while it is, at the same time, the oldest of all. The vast extent of its field, including the entire universe within its bounds, leads to its having

ASTRONOMY

a number of different branches. There is, first, a branch which embraces our general knowledge of the heavenly bodies, their motions, aspects, and physical constitution. This branch is commonly termed descriptive or general astronomy. It is now recognized as having two divisions, one relating principally to the motions, mutual relations, and general aspects of the heavenly bodies; the other to their physical constitution, considered individually. The former division is sometimes termed astrometry, because it is principally concerned with measurements of position, motion, mass, etc. The other branch is termed astrophysics, and is that which has received its greatest development in recent times. There is also a branch which teaches the methods of observing the heavenly bodies, including the instruments used in observation and measurement, and the principles governing their use, as well as the practical computations incident thereto. This branch is termed practical astronomy. Another branch is the mathematical one, which determines the orbits and motions of the heavenly bodies by deductive methods, taking as a basis the facts of observation and the laws of motion, especially that of gravitation. This branch treats of the orbits of the heavenly bodies and of the methods of computing the effects of their mutual attraction. It is commonly termed theoretical astronomy, while the more purely mathematical theory is known as celestial mechanics.

The subject of astronomy is treated in the present work on the following plan: We begin with a brief but comprehensive survey of the universe, referring to special articles—Stars, Universe, Nebulae, Solar System, etc., for details. This survey will be followed by reviews of Practical Astronomy, Theoretical Astronomy, and of the historical development of the science.

Descriptive Astronomy—Considered as to their nature, the heavenly bodies may be divided into two great classes; the one, incandescent bodies which shine by their own light; the other, opaque bodies which are visible only by reflecting the light of some incandescent body in their neighborhood. Examples of the first class are the stars which stud the heavens at night; examples of the second are the planets, of which our earth is one. From the very nature of the case, little can be learned of the possible number of opaque bodies which may exist in the universe. There may be some rather uncertain ground for inferring that they are less massive and less numerous than the incandescent bodies; but it is sometimes supposed that they may far outnumber the latter without our being aware of the fact. The stars are scattered through the wilderness of space at distances which baffle all our powers of conception. Light moves with such speed that it would make the circuit of the earth seven times in a single second. But the cases are rather exceptional when a star is so near one of its neighbors that light would not take years to travel over the distance which separates them. Indeed, the only known exceptions belong to the class of double or multiple stars—two or more such bodies forming a system by themselves. There is only one star so near us that its light would reach us in four years, and the same is probably true of most other stars. That the universe of stars extends to distances

which light would require several thousand years to travel is certain; but no well-defined limit has yet been set to its extent. Our sun is one of the stars, and is the one of which we know most because of our proximity to it. It is the centre around which eight great planets and a number of other bodies perform their revolutions. On one of these great planets, the third in the order of distance, we dwell. Our knowledge of the heavens is largely conditioned by our residence on this planet. We see the other planets by the light of the sun, which they reflect. They present to the naked eye the appearance of stars; and it is only when scrutinized with the telescope that they are found to have a measurable apparent size. Vast indeed is their distance from the sun when measured by our standards. Yet, the dimensions of our solar system are very small when compared with the distance which separates the stars. Light passes from the sun to the outer planet, Neptune, in about four hours, while, as we have said, it requires years to reach any star. The nearest star is therefore thousands of times farther than the most distant planet. A most interesting question is whether other stars have systems of planets revolving round them, as our sun has. This is a question which it is impossible to answer conclusively. Planets revolving round the stars would be absolutely invisible through the most powerful telescope that man can ever hope to construct. In special cases, however, evidence on the subject is afforded by the spectroscope, which shows that great numbers of stars really have one or more dark bodies revolving around them. But, in order to be observable with the spectroscope, these bodies must be vastly larger than the planets which revolve round our sun. The existence of a planet like that on which we dwell could not be determined even with the best spectroscope.

The bodies of the solar system are bound together by the law of gravitation. Were it not for the attraction of the sun each planet would fly off in a straight line through space. Through the attraction of the sun all the planets are kept in their several orbits. Every consideration leads us to believe that gravitation extends from one star to all the others, but diminishing as the inverse square of the distance. But its effect on bodies so distant as the stars is too minute to be observed. Revolving double stars, however, show that in these exceptional cases, systems of two stars in proximity to each other are subject to the law of mutual attraction.

The three fundamental facts which determine the great phenomena of astronomy, as we observe them in the course of our lives are (1) the globular form of the earth on which we dwell; (2) its diurnal rotation on its axis; (3) its annual revolution round the sun. The first of these facts is so familiar to all that we need not discuss it. Out of it grow the general phenomena of the sky. The heavenly bodies surround us in every direction. They are really as numerous by day as by night, only in the former case they are blotted out by the brightness of the sky. To imagine the heavens as they really are we must fancy stars as always visible in every part of the sky. Then, by day, we should see the sun among the stars, and perhaps the moon also. Mere observation

ASTRONOMY

of a heavenly body gives us no idea of its distance. By looking at a star we cannot tell whether its distance is to be measured by hundreds of miles, by millions, or by thousands of millions, which it actually is. Hence, all the heavenly bodies appear to us to be at the same distance, as if they were set upon the interior surface of a stupendous sphere in the centre of which we seem to be placed. This imaginary form is called the celestial sphere; it is one of the most ancient conceptions of astronomy, and it is used in the science to the present day to represent the appearance of the heavens. It is divided into two hemispheres, a visible and an invisible one. The visible hemisphere is the half which is above the horizon, which we call the sky and can always see, except so far as obstructions or inequalities of the ground may prevent. The other half is below the horizon, and is hidden from our view because the earth is opaque. Were the latter transparent, we should see the heavenly bodies in every possible direction. The revolution of the earth on its axis produces the phenomena of day and night, and the apparent rising and setting of the heavenly bodies. This is known as the diurnal motion. The latter may be considered in two aspects, either as the real revolution of the earth on its axis, in a direction always toward the East, or as an apparent revolution of the heavens in the opposite direction, due to our being unconscious of the motion of the earth. In consequence of the diurnal motion the celestial sphere, seeming to our eyes to carry the heavenly bodies on its interior surface, appears to us to make a daily revolution on its axis. The two opposite points of the celestial sphere situated on the prolongation of the earth's axis are called the celestial poles. On these poles as pivots the celestial sphere seems to turn. They are called north or south according to the direction. Their apparent position in the sky depends on the latitude of the place where the observer is situated. A heavenly body situated at either pole does not seem to have any diurnal motion. This is nearly the case with the pole star, which dwellers north of the equator can always see at an altitude above the northern horizon equal to their latitude. A voyager into the southern hemisphere sees the pole star set when he crosses the equator. Then, the south polar star would be visible if there were one. But it happens there is no bright star very near the southern prolongation of the axis. In the United States, say from 30° to 45° of latitude, the pole star is at a corresponding altitude above the horizon, and all the stars in its neighborhood appear to make a diurnal rotation round it, without changing their form or position, and without ever setting. Any one who chooses can verify this fact by noting the appearance of the northern sky about the end of twilight, and then looking at it again two or three hours later. He will then see that stars below the pole have moved toward the east; those on the east side of it have risen higher, and those on the west side are lower, while those above have moved over toward the west. For us, therefore, the sphere of the heavens may be divided into three parts; a circle round the north celestial pole within which stars never set; a corresponding circle round the south

pole, the stars in which never rise above our horizon, and a broad middle region where they rise and set.

To represent the positions of the stars, astronomers imagine circles on the celestial sphere corresponding to the circles of longitude and latitude on the earth. As we imagine north and south meridians drawn on the earth from one pole to another, to measure terrestrial longitudes, so we imagine in the heavens circles drawn on the sphere from the north celestial pole to the south one. As the longitude of a place on the earth is expressed by the angle which its meridian makes with the meridian of Greenwich, so the corresponding quantity for a star is the angle which the circle through it makes with a certain prime meridian on the celestial sphere. This quantity for the stars is not called longitude, but *right ascension*, and the celestial meridians which determine it may be called *hour circles*.

In the same way as we have on the earth a great circle spanning it everywhere, equally distant from the two poles, and called the equator, so we imagine a circle spanning the heavens, everywhere equally distant from the north and south celestial poles, which is called the celestial equator, or the equinoctial. At any one place this circle will be apparently fixed in its position, always intersecting the horizon at its east and west points, and, in our latitudes, intersecting the meridian south of the zenith by a distance equal to our distance from the north pole. For example, to a dweller in latitude 40° , the highest point of the celestial equator will be 40° from the zenith, and 50° above the horizon. From this point it spreads toward the east and west until it intersects the horizon as just stated. As a traveler journeys south, the position of the celestial equator becomes more and more nearly vertical; at the equator it rises vertically and passes through the zenith; south of the equator it passes north of the zenith.

As the latitude of a place is measured by its angular distance from the equator north or south, so the corresponding number for a star is measured by its mean angular distance from the celestial equator, whether north or south. This is called the star's *declination*. Thus the right ascension and declination of a star determines its position on the celestial sphere just as longitude and latitude determine the position of a city on the earth.

We now have to consider the effect of the annual motion of the earth round the sun. If we watch the heavens at a certain hour every evening, say eight o'clock P.M., we shall find that the stars are every night a little farther advanced in their diurnal motion than they were the night before. If they are in a certain position at eight o'clock on one evening, they will pass the same position four minutes before eight on the next night, eight minutes before eight on the next night, and so on. In the course of a year these continually accumulating changes make up the whole 24 hours, so that a star which is in the zenith this evening will be on the meridian at eight o'clock in the morning six months hence, while at eight in the evening it will be at its greatest distance below the horizon. If we could see the sun among the stars, what we should notice would be that our luminary always forges a little

farther east day after day, and in the course of a year seems to make a complete revolution among the stars. The result is that while the sun rises and sets 365 times, the stars rise and set 366 times. Since the latter are always in the same absolute direction, and seem to rise and set in consequence of the earth's rotation on its axis, we infer that the direction of the sun from the earth goes through a complete revolution in the course of a year. In other words, the sun appears to us to make an annual revolution around the celestial sphere among the stars. Since the time of Copernicus it has been known that this appearance is due to the actual revolution of the earth around the sun.

The apparent path of the sun among the stars can be mapped out by astronomical observation. When carefully observed, it is found to be a great circle of the sphere, called the ecliptic. We thus have two imaginary circles of fundamental importance spanning the heavens. One is the celestial equator, the other the ecliptic in which the sun seems to travel. These circles do not coincide, but intersect each other at two opposite points at an angle of $23\frac{1}{2}^\circ$. This is called the *obliquity of the ecliptic*. The result of it is that during one half the year the sun is south of the celestial equator, and during the other half is north of it. In the northern half of its course we have summer in the northern hemisphere and winter in the southern; in the southern half we have summer in the southern hemisphere and winter in the northern. Thus the changing seasons are due to the obliquity of the ecliptic. If the latter coincided with the equator, we should have no such annual round of seasons as that with which we are familiar.

There are two opposite points on the celestial sphere at which the equator and the ecliptic intersect. These are called *equinoxes* because, when the sun crosses them, the days and nights are equal all over the earth. That equinox which the sun passes toward the north is called the vernal equinox, because the crossing marks spring in the northern hemisphere. The other is called the autumnal equinox for a similar reason. Observations continued through many centuries show that the equinoxes are not fixed, but travel slowly along the ecliptic at such a rate that they make a complete revolution from the east toward the west in about 26,000 years. This motion is called the *precession of the equinoxes*. Its existence shows that the direction of the earth's axis is slowly changing, and hence the position of the celestial pole is changing also. Since the equator is defined by the condition that it spans the heavens midway between the celestial poles, this change in the poles causes a corresponding change in the equator.

The actual motion of the pole is at the rate of about $20''$ per year. The smallest visible object that can be seen to be anything else than a point of light subtends an angle of about $1'$ or $60''$. It follows that the pole moves through this smallest visible space in three years. In a long life of 90 years the change would be about equal to the diameter of the sun or moon. The centre of the motion is the pole of the ecliptic which is distant from that of the equator by about $23\frac{1}{2}^\circ$. Owing to the smallness of the obliquity, the equinox travels along the ecliptic at more than twice the rate of the pole, or about $50''$ per year. It

has therefore changed about 30° since its motion was first noticed, about 2,000 years ago. It is found that the planets describe their course around the sphere in circles which do not deviate greatly from the ecliptic. A belt of the heavens extending 11° on each side of the ecliptic will include all the planets visible to the naked eye. This belt is called the *zodiac*. Beginning at the vernal equinox it is divided into 12 portions, of 30° each, known as the signs of the zodiac. In former times great stress was laid upon the entrance of the sun into these several signs, which entrances occurred about a month apart. They now occur about the 20th of every month. In our times, when the superstitions connected with this subject have vanished, the entrance of the sun into the signs is no longer of importance. (See *ZODIAC*.) There are also 12 constellations, beginning with Aries, and ending with Pisces, which have the same names as the signs of the zodiac, and are scattered along its course. Two thousand years ago these constellations coincided pretty closely with the signs. But now, in consequence of the precession of the equinoxes, the two no longer correspond. The sign Aries is now located in the constellation Pisces; the sign Taurus in the constellation Aries, etc.

The Time of Day.—It is in its relations to times and seasons that the results of astronomical science come into every household. Our daily round of activity and rest is determined by the earth's rotation on its axis, alternately bringing us under the sun, and then carrying us around until it is hidden from our sight. A century ago people used to set their clocks at 12 when the sun crossed the meridian. This moment, being the middle of the day, is noon properly so-called. But if a good clock is exactly regulated, and kept going all the time, it will not show noon at the true time. The reason is that the intervals of time between one noon and the next are not exactly the same. See *TIME*.

Bibliography.—The most extended general treatise on astronomy for the use of the general reader is 'Chambers' Astronomy' (3 vols., 8 vo., London); briefer is Newcomb's 'Astronomy for Everybody'; Ball, 'Story of the Heavens'; Flammarion, 'Popular Astronomy'; etc.

SIMON NEWCOMB, LL.D.,
Washington, D. C.

Astronomy, History of. We may recognize four great periods in the history of astronomical knowledge. The first and most ancient is that in which no accurate observations were made, but in which men had a general knowledge of the apparent annual revolution of the sun, of the constellations, and of the relation of the sun's annual course to the changes of the seasons. The next period was that of the celebrated Alexandrian school, so-called because Alexandria was the principal seat of its activity. This period was distinguished as that at which the first attempts were made at precise observation and measurement. It began three or four centuries before Christ. It is very remarkable that, at so early a period as this, men to whom all our modern science was completely unknown, had so far advanced in astronomical observation as to measure the obliquity of the ecliptic, determine the times of the equinoxes, and detect their precession. The latter was done by a comparison of two meth-

ASTRONOMY

ods of determining the length of the year, as measured by the sun's apparent revolution around the celestial sphere. Timocharis, who flourished about 300 B.C., determined the moment at which the sun crossed the equinox by means of an east and west line on the level sandy plains of Egypt, showing exactly where the sun rose or set. The day on which the point of setting in the west was exactly opposite that of its rising in the east marked the equinox, which could thus be determined within a few hours. The annual course of the sun can also be determined by the time which it takes to return to the same position among the stars after an annual apparent revolution. As the stars and sun cannot be seen at the same time, the adopted plan was to measure the distance of the sun from the moon before sunset, and after dark to measure the distance from the moon to some bright star. Allowing for the motion of the moon during the interval, the distance of the sun from the star would be known. In this way the curious discovery was made that the year as determined from the equinoxes was several minutes shorter than that determined from the stars. This discovery was made by Hipparchus through a comparison of his observations with those of Timocharis about 150 years before.

Erasthenes, who flourished just before Timocharis, was enabled to estimate the size of the earth. This he did by noting that at the ancient town of Syene, in central Egypt, the sun was exactly in the zenith at the time of the summer solstice, so that it illuminated the bottom of a well, while at Alexandria it was $1/50$ of a circumference south of the zenith. He therefore concluded that the circumference of the earth was 50 times the distance between Alexandria and Syene. The latter being 50,000 stadia, it followed that the circumference of the earth was 250,000 stadia.

Hipparchus was considered as the greatest astronomer of antiquity. He made more accurate observations than any of his predecessors upon the courses of the sun, moon, and planets, determining their times of revolution with extraordinary exactness. Unfortunately none of his works survive, and our knowledge of them is derived mainly from Ptolemy's 'Almagest.'

Ptolemaic System.—Ptolemy (130–150 A.D.), besides being a practical astronomer, was accomplished as a musician, a geographer, and a mathematician. His most important discovery in astronomy was the evection of the moon. He also was the first to point out the effect of refraction. He was the founder of the false system known by his name, and which was universally accepted as the true theory of the universe until the researches of Copernicus exploded it. The Ptolemaic system placed the earth, immovable, in the centre of the universe, making the entire heavens revolve round it in the course of 24 hours. The work by which he is best known, however, is the collection and systematic arrangement of the ancient observations in his great work, the 'Megale Syntaxis,' which gives a complete *résumé* of the astronomical knowledge of the day. This work was translated into Arabic in the first part of the 9th century and was called by the Arabs the 'Almagest,' and by this name it is known today in its various translations into Greek and

Latin. The most important part of it is the seventh and eighth books, which contain the catalogue of stars which bears Ptolemy's name, though it is only a compilation of the catalogue of Hipparchus with the positions brought up to the time of Ptolemy. The advance of astronomy almost ceased, after the death of Ptolemy, and his 'Almagest,' together with the false system of the universe which it taught, continued to be the recognized authority in Europe for the next 14 centuries.

With the death of Ptolemy, everything in the way of actual progress in astronomical theory appeared to cease. The Arabians continued astronomical observations from time to time, and made or proposed many improvements in the ancient astronomical instruments, but they slavishly followed the system of Ptolemy, and made no attempts to penetrate the mystery of the celestial motions. They had little capacity for speculation, and throughout held the Greek theories in superstitious reverence. The most illustrious of the Arabian school were Albategnus, or Al Batani (880 A.D.), who discovered the motion of the solar apogee, and who was also the first to make use of sines and versed sines instead of chords; and Ibn-Junis (1000 A.D.), an excellent mathematician, who made observations of great importance on eclipses of the sun and moon and the motions of Jupiter and Saturn, and who was the first to use cotangents and secants. Likewise, at about the same time, Abul Wefa discovered the third inequality in the moon's motion, the variation, and determined its amount. About four centuries later, in the first half of the 15th century, lived Ulugh Beigh, a Tartar prince, who made important additions to astronomical knowledge.

The third period commenced when Copernicus, in 1543, first demonstrated the true theory of the universe to his fellow men in his great work 'De Revolutionibus Orbium Cœlestium.' His two fundamental principles were that, instead of the diurnal motion of the heavens being real, it was only apparent, being due to the revolution of the earth on its own axis; and that the apparent revolution of the sun around the sky was, in the same way, due to the actual revolution of the earth around the sun, which latter remained at rest. Centuries of observation have shown that these two principles explain so exactly every detail of celestial phenomena that they are subject to no more doubt than our conclusions as to the arrangement of streets and houses in a city which we see every day of our lives. Half a century after the death of Copernicus flourished Galileo and Kepler, of whom the first invented the telescope, while the second demonstrated the correctness of the Copernican theory, and also showed that the planet Mars revolved around the sun in an ellipse with the sun in its focus.

The invention of the telescope added another proof to the Copernican theory, and also enlarged our views of the universe by showing that Jupiter and his satellites formed a miniature solar system on the Copernican plan; that the planet Venus had phases like the moon; that the moon itself had a variegated surface apparently similar to that of our globe, and that the wonderful Milky Way was composed of innumerable stars too faint to be seen sep-

ASTRONOMY

arately by the naked eye. The spots on the sun were also discovered, and the rotation of our central luminary on its axis made known. Such enormous advances were too great for the human mind at once to grasp, and the generation in which Galileo lived had to pass away before the Copernican theory was universally accepted by the learned world. To this same period belong the observations of Tycho Brahe on the motions of the sun, moon, and planets, which were, most unfortunately, made just before the invention of the telescope, and so failed of the precision which would have been gained by the use of that instrument. But, as it was, they were the basis on which Kepler founded his celebrated laws of planetary motion.

The fourth and last period began when Newton showed that all the complicated phenomena of the celestial motions—the revolution of the planets in elliptic orbits, and the revolution of the satellites around their primaries, were all due to the mutual gravitation of these bodies, and took place according to the same laws which govern the motion of matter around us on the earth. As in the case of the Copernican theory, it took the learned world a whole generation to grasp the idea of Newton as to the theory of gravitation. The progress made in our knowledge of the celestial motions during the two centuries since Newton's time have all rested on the principle which he discovered.

Toward the end of the 18th century, Sir William Herschel, then in the zenith of his fame, was interesting the whole world by his wonderful discoveries. With his great reflectors he made a step forward in the size and power of the telescope greater than any before or since. Although his greatest and best instrument would be considered extremely imperfect at the present time, those which it superseded were hardly more than what we should now call spy glasses. Herschel was so far the greatest figure of the time in astronomical science, and his work so overshadowed that of his contemporaries on the continent, that the work of everyone else at the time seems unimportant in comparison. Yet not only were great successors of Herschel coming on the stage, but important additions to our knowledge of the heavens were being made outside of England. William Herschel's son, John, was a lad of eight years. In France, Arago, a boy of 14, was fitting himself for the *École Polytechnique*. At Paris, Lalande, the leading astronomer of France, was actively preparing a catalogue of the fainter stars with an instrument which would now be consigned to the junkshop. But it was the first attempt that had ever been made to determine accurately the positions of the many thousand telescopic stars invisible to the naked eye, and in consequence the '*Histoire Céleste*' is still one of the classics of the astronomical investigator. In Germany, Olbers combined the professions of physician and astronomer, and Bessel, a youth of 16, was clerk in a mercantile house.

The first day of the century was marked by a discovery of capital interest and importance. The wide gap between the planets Mars and Jupiter had been a source of wonder, and the conviction that there must be a planet in it had become so strong that an association of astron-

omers was formed to search for it. But, on 1 Jan. 1801, before they got to work, Piazzi, the Italian astronomer of Palermo, found Ceres. The year following Olbers discovered Pallas, and propounded his celebrated theory that the newly formed bodies were fragments of a shattered planet, more of which might be found. This anticipation was amply justified by the result, though the theory of a shattered planet has long been rejected. By 1868 the number reached 100. When the sky was systematically watched 100 more were found. When the process of photographing the stars was perfected, so many new ones were found on the photographic plates that it is almost impossible to follow them up. About 450 have had their orbits mapped out. See **ASTERIODS**.

In this country, David Rittenhouse, almost the only American of Revolutionary times who has a place in scientific history, had been dead four years when the century began, and there was no one to take his place. He was one of the committee of the American Philosophical Society that made an extensive and well-planned set of observations on the transit of Venus in 1769. The first American after the Revolution to acquire eminence in any department of astronomical science was Nathaniel Bowditch. A Boston ship-captain by profession, he first prepared his '*Navigator*,' the standard work of the sailor through most of the century. He mastered the great work of Laplace, and made it accessible to students by a translation and commentary explaining the processes in detail. So far as practical astronomy was concerned, it might be regarded as non-existent among us during at least the first third of the century. We know little more of it than that Robert Treat Paine, grandson of the signer of the Declaration of Independence, used to compute eclipses and publish the results in the '*American Almanac*,' and the Boston *Advertiser*. About 1840, Dr. Lardner paid a visit to this country and remained several years, delivering public lectures, which, though not of a high order when measured by the standard of to-day, were much above any which Americans had then heard.

During the first half of the century, the advance of astronomical science consisted principally in a form of development which goes on without any striking discovery, and has therefore little interest for the general public. When bright comets appeared they were carefully studied by observers, at the head of whom were Bessel and Olbers. It was thus found that the tail of a comet was not an appendage carried along with it, like the tail of an animal, but merely a stream of vapor arising from it and repelled by a force residing in the sun. The discovery of telescopic comets by observers, here and there, continually added to the number of these bodies known. Most of them were found to be moving in such orbits that they would require thousands of years, perhaps tens of thousands, to return to the sun, if, indeed, they ever reappeared. But this, though the general rule, is far from being universal. From time to time comets were found moving in closed orbits and performing their revolution in periods of a few years, mostly between 3 years and 10.

One of the noteworthy discoveries of the third quarter of the century was that of the

ASTRONOMY

relation between comets and shooting stars. The first discovery of this relation came about in a curious way. The researches of H. A. Newton and others had made it quite clear that shooting stars were due to the impact of countless minute bodies revolving around the sun in various orbits and now and then encountering our atmosphere. It was also known that the great November meteoric showers must be due to a stream of such bodies. One astronomer computed the orbit of the November meteors; and another quite independently published the orbit of a comet which appeared in 1866. A third astronomer, Schiaparelli, noticed that the two orbits were practically the same. The conclusion was obvious. The minute bodies which caused the shower moved in the path of the comet and were portions of its substance which had from time to time separated from it. The disappointing failure of the shower in 1899 and 1900 can have but one cause—a small change in the orbit of the meteoric swarm caused by the attraction of the planets. Nor has the comet associated with them shown itself; it was perhaps dissipated like that of Biela's. Apart from this, the question of the constitution of comets is still an unsolved mystery. Their spectrum is that of a body which shines by its own light. But no one can explain how a body in the cold and vacuous celestial spaces can so shine. The brighter comets may have a more or less massive nucleus. Yet it is not certain that the nucleus is entirely opaque. In 1882, the astronomers at the Cape of Good Hope enjoyed an opportunity which no one of their brethren ever enjoyed before or since; that of seeing a comet enter on the disk of the sun. Unfortunately, the sun disappeared from view a very few minutes afterward. But not a trace of the comet could be seen on the sun as a spot. It was seemingly quite transparent to the solar rays. That the fainter comets have no nucleus and are merely composed of a collection of foggy particles seems certain. How are these particles kept together through so many revolutions? This question has not yet been satisfactorily answered. See COMET.

The Greenwich Observatory was taken in charge by Airy in 1834. He immediately instituted a great improvement in its organization and work, but it was not till 1850 that he acquired for it new instruments of great importance. He was the founder of what has sometimes been called the Greenwich system: the astronomers of an institution taking a part like those of soldiers in an army, making all their observations on a plan prescribed by the authority and rarely using their own discretion in any way. The mathematical theory of the motions of the planets, and especially the moon, received its greatest improvement from the hands of Hensen, born about 1795. He may fairly rank as the greatest of celestial mechanicians since the time of Laplace. Toward the middle of the century, he prepared the first tables of the moon which could satisfy the requirements of modern astronomic theory. These were published by the British government in 1857, and have now formed the basis of astronomical ephemerides for nearly half a century. The most striking event of the mid-century period, and one which in the popular mind must long hold its place as among the greatest of intellectual achievements, was the computation by

Leverrier of the position of an unknown planet from its attraction on Uranus. The speedy discovery of the planet on the very night it was first looked for was, for the public, a proof of the absolute correctness of gravitational theories that surpassed all others. It was as a first and bold attempt to sail into an unknown sea; yet, as in the case of Columbus and the Atlantic, its repetition would not now be generally considered a difficult matter. With the discovery of Neptune and with the advance in the art of astronomical observation, improvements in the theories of the movements of the planets were necessary. The greatest step forward in this direction was taken by Leverrier. Among the results of his work was the discovery that the perihelion of Mercury moves more rapidly than it should under the influence of gravitation. This excess of movement has been abundantly proved by observation since his time, but its cause is still one of the greatest mysteries of gravitational astronomy. As a general rule, it may be said that during the last half century the Germans have been the leaders in astronomical research. Their work on the subject has been more voluminous than that of any other nation. The leading astronomical journal of the world is still that of Germany. But when we consider not quantity of work, but the special importance of particular works, precedence has, from one point of view, passed to America. While, perhaps, we still have fewer students pursuing astronomy in the United States than in Germany, the number of men among us who have acquired the highest distinction and most skillfully made applications of this science is greater than in any other country. The rapidity of progress from small beginnings is very remarkable.

In 1832, Professor Airy delivered, before the British Association for the Advancement of Science, an address on the progress of astronomy, which soon acquired celebrity. The state of astronomy in different countries was reviewed. America was dismissed with the remark that he was not aware of any observatory existing in that country. In the revival of astronomy among us and its advance to its present position in popular favor, one agency has not been esteemed so highly as it deserves. Contemporaneous with the visit of Dr. Lardner were the lectures of Prof. Ormsby M. Mitchell. With unsurpassed eloquence he explained the wonders of astronomy to audiences intensely interested in the novelties of the subject. From a scientific point of view the lectures were probably not of a high order, nor could it be said that Mitchell himself, active and enthusiastic though he was, was a profound astronomer. Yet it may well be said that to him is due the ability of our astronomers since that time to secure the public support necessary to the erection of the fabric of their science. A few years after Airy's address small college observatories were founded at Williams College and at the Western Reserve College, Ohio. These were doubtless a stimulus to students, but can hardly have added to astronomical science. When the Wilkes Exploring Expedition was being organized, it was found necessary to have a continuous series of observations made at home during the absence of the expedition which, compared with those made on the ships, would en-

ASTRONOMY

able the navigators to determine the longitudes of the lands they discovered. A little wooden structure, erected by Captain Gilliss for this purpose, on Capitol Hill, Washington city, was in some sort the beginning of our National Observatory. The actual foundation of the latter was almost contemporaneous with that of the Harvard Observatory, both being commenced about the year 1843. The Harvard Observatory was placed under the direction of William C. Bond, who had, for many years, made observations, first at his own house in Dorchester, and then on top of a house at Cambridge. At Washington the Naval Observatory was placed under the charge of Lieut. Maury. After getting its instruments in operation, he devoted himself almost entirely to those researches on ocean currents, which, so long as the commerce of the world was carried on mostly in sailing vessels, were of the first importance. But the institution soon acquired astronomical celebrity in other ways. Here Sears Cook Walker made the first thorough investigation of the orbit of Leverrier's newly discovered planet, and showed that it had been twice observed by Lalande as far back as 1795, but without its character being suspected. Here also the device of recording the transits of stars by means of the chronograph and determining the longitude of places by telegraph found their first application. New observatories, some founded in connection with colleges, others by private individuals, now sprang up rapidly among us in every quarter. Twenty-four were enumerated by Loomis in 1856. What figure the number has now reached it is impossible to say. Whatever it may be, it marks rather the interest taken by the intelligent public in astronomical science than the actual progress of knowledge. The number of these institutions which have actually made important contributions to astronomical knowledge is naturally very small. It is to a few leading ones that most of the progress is due.

Two of these have put almost a new face upon astronomical science. These are the Harvard Observatory at Cambridge and the Lick Observatory of California. The former, while a respectable institution from its foundation, and made famous by the works of the Bonds, had never commanded the means necessary to prosecute astronomical research on a large scale. When Pickering assumed the directorship in 1875, he devoted his energies to those branches of research which are now known under the general term of astro-physics, being concerned with the physical constitutions of the heavenly bodies rather than with their motions. The extension of his work was made possible by very large additions to the endowment of the observatory. It thus became one of the best-supported institutions of the kind in the world. Photometry and spectroscopy have been its main subjects. With the aid of a branch established in Arequipa, Peru, the magnitudes of all the stars in the heavens visible to the naked eyes, as well as many fainter ones, have been determined. Among its remarkable discoveries have been those of new stars. It was formerly known that at long intervals, sometimes more than a century, sometimes less, stars apparently new blazed out in the sky. Really the star was not new, but was an old and very small one of which the light was tem-

porarily multiplied hundreds of thousands of times. A system of constantly photographing the heavens showed that such objects appear every few years, only they do not generally attain such brilliancy as to be noticed by the unassisted eye. The success of the Lick Observatory in a different, yet not wholly dissimilar, direction must be regarded as one of the most extraordinary developments of our time. Commencing work about the beginning of 1888, under the direction of Holden, and supplied with the greatest telescope that human art had then produced, the observations of Burnham and Barnard excited universal interest, both among astronomers and the public. The discovery of a fifth satellite of Jupiter, perhaps the most difficult object in the heavens, was made there by Barnard in 1892. Later, the optical discovery of the companion of Procyon, an object known to exist from its attraction on that star, was made by Schaeberle. But its most epoch-making work is due in still more recent years to Campbell, by measurements of the motion of stars in the line of sight with the spectroscope. The possibility of measuring such motions was first demonstrated by Huggins, some thirty years ago, and was applied both by him and by the observers at Greenwich. Then a great step forward was made by photographing the spectrum instead of depending on visible observation. This step was mostly developed by Vogel, at the Potsdam Observatory, near Berlin. In the case of the variable star, Algol, Vogel was thus enabled to show that the fading away of its light at regular intervals of something less than three days was really a partial eclipse of the star by a dark body revolving around it. He also showed that three other bright stars varied in their motions to and from the earth in a way that could arise only from the revolution of massive but invisible bodies around them. Now, at the Lick Observatory, Campbell, armed with the best spectrograph that human art could make, the gift of D. O. Mills, has, by the introduction of every refinement of his method, brought into these measures a degree of precision never before reached. The cases of variable motion, as found by him, are so numerous as to indicate that isolated stars may be the exception rather than the rule. It is true that up to the present time he detects variation in only about one star out of thirteen which he observes. But it is only in the exceptional cases, where the planet is almost as massive as the star itself, that the motion can be detected. It is not at all unlikely that, for every spectroscopic binary system (as these pairs of objects are now called) we can detect, quite a number may exist in which the revolving planet is too small to affect the motion of the star. With the beginning of a new century, astronomy, the oldest of the sciences, seems to be entering upon a new career, with a prospect of a life before it the end of which no man can foresee.

Bibliography.—In French, we have the monumental works of Delambre; in English, Agnes M. Clerke., 'History of Astronomy in the 19th Century'; Berry, 'History of Astronomy.'

SIMON NEWCOMB, LL.D.,
Washington, D. C.

Astronomy, Practical. The instruments of observation used by the working astronomer are made up mainly of various combinations

ASTRONOMY

of three appliances. These are the telescope, the graduated circle, and the clock. (For the principles of the first see TELESCOPE.) With the clock is associated the chronograph as part of a combination for measuring time. Many auxiliary appliances are also brought into use of which the micrometer and the spirit level are the most important. The usefulness of the telescope in measurement does not arise solely from its enabling the observer to see objects

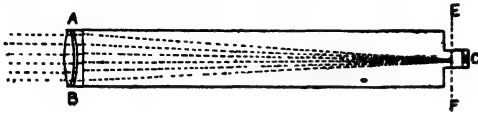


FIG. 1.

otherwise invisible. A telescope with no magnifying power at all would still enable him to determine the directions of the heavenly bodies at any moment with greater accuracy than would otherwise be attainable. The principle on which the telescope is used in celestial measurement will first be explained. Let Fig 1 represent the section of a telescope; A B being the object glass, and C the eye-end, where the rays from a star are brought to a focus. The lines converging to the plane E F represent the rays of light from a star reaching the focus. Here they form an image of the star, which the observer sees by looking into the eye-piece at C. The plane, of which the dotted line E F is a section, passing through the focus at right angles to the telescope, is called the focal plane. By changing slightly the direction in which the telescope is pointed, the rays may come to a focus on any point in this plane not too far from the axis or central line of the telescope. In the focal plane is placed a system of very fine threads which the observer sees when he looks into the eye-piece. These threads are generally made of fibres of spider-web, a substance so well adapted to this purpose that nothing better has yet come into use. To fix the ideas we shall suppose several cross threads; then the observer by looking into the telescope may see the stars and the

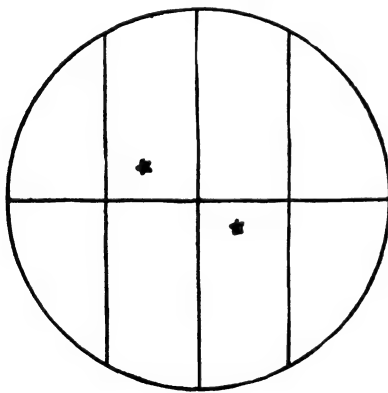


FIG. 2.

cross-threads as represented in Fig. 2. Here we have the images of two stars quite near the crossing point of the threads. The observer moves the telescope until one of the stars is seen exactly at the point of intersection of the two threads. The fundamental principle in the

use of the telescope is that when this occurs, the star is apparently situated exactly on a straight line passing through the cross threads, and the centre of the object glass. This line is called the line of sight of the telescope.

Now, let the observer move the telescope until he finds another star, whose image he brings upon the cross threads. The angle through which he has moved the telescope from one star to the other, supposing the two stars to be at rest, will then be precisely the angle between the rays of light coming from the two stars. If, then, any system is adopted of determining through how many degrees, minutes,

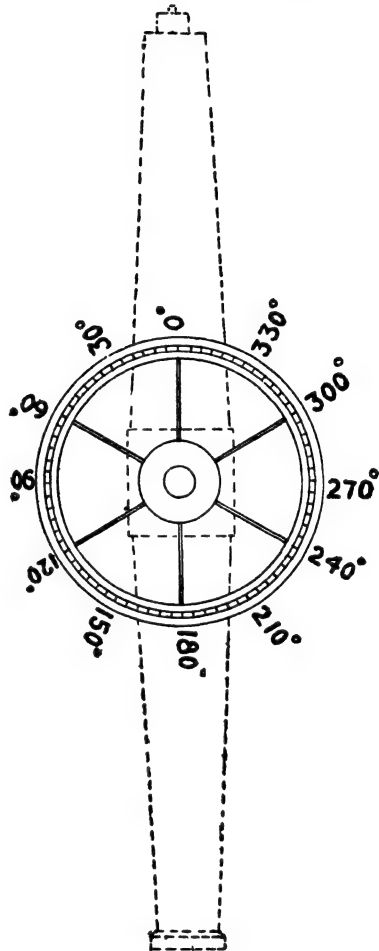


FIG. 3.

etc., the telescope has moved, the angular distance between the stars is known. The studious reader will remark that, owing to the rotation of the earth, the image of a star seen in a fixed telescope is continually moving across the field of view. To explain the principle we must, however, leave this motion out of account, or suppose it allowed for.

We have next to show how a large angle through which the telescope may be moved is measured. This is done by means of the graduated circle, a representation of which is shown in Fig. 3. It will be seen that the rim of the

ASTRONOMY

circle is divided up into degrees by fine lines as represented in the figure, where, however, only every fifth degree is marked. In the instruments actually used in astronomy, not only is every degree marked, but in the circles for the finest observations, the degrees are still farther sub-divided into spaces of 5', 3', or even 2'. Since there are 360° in a circumference, it follows that in a division to 2' there will be 10,800 of these graduations, or fine marks, on the circle. These marks must all be as nearly equi-distant as human art can make them, and the problem of doing this, together with that of making them so fine and sharp that they

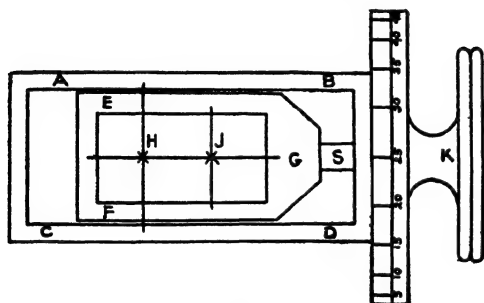


FIG. 4.

can be used in the most precise measurement, is one of the most difficult with which the instrument maker has to deal. The way in which the divided circle is used to measure the angular motion of the telescope is shown by the dotted outline of the latter. The circle is attached to it so that both move on an axis concentric with the circle and perpendicular to its plane. Then, when the telescope is turned on this axis, the circle turns with it as a grindstone does on its axis. The distance through which telescope and circle are turned is then measured by means of the graduations. To show how this is done, other appliances must be described.

Instead of two stars being far apart, so that the telescope has to be moved, they may be

The Filar Micrometer.—This adjunct is so called because an essential part of it consists in fine threads of spider lines stretched across the field of view, as already described. The aim of its construction is to admit of these threads being moved in a direction at right angles to their length, by a very fine screw, so that the space over which they pass may be measured by the turns of the screw. The principal appliances for effecting this are a fixed frame, A B C D, Fig. 4, in which slides another frame, E F G, moved by a fine screw at S. Across this inner frame is stretched the spider line J, and across the fixed one the spider line H. To the head of the screw is attached a cylindrical rim, which has 100 or some other number of divisions cut upon it. An index mark serves to show how far the screw is turned. An apparatus for measuring the number of turns of the screw is attached, but need not be described here. Then when the observer turns the screw, the movable frame of the spider lines is slowly carried along with it. The position of the spider lines as they move is then shown at every moment by the number of turns of the screw and the fractions of a turn. To show the accuracy with which this can be done, we remark that the screws used by astronomers may have 100 or even 125 turns to the inch. Then, each revolution of the screw, as read off on the head, measures to a motion through this space. There being 100 graduations on the head, each graduation may measure the motion of 1-10,000 of an inch. But the observer may estimate the tenths between the divisions, thus carrying his measurements down to the 1-100,000 of an inch. Beside the movable spider line across the frame, fixed spider lines may also be stretched across the fixed frame. Then we shall have two systems of spider lines, one movable and the other fixed. The relation of each to the other is measured by the turns of the screw.

To determine the exact position of the graduated circle, a filar micrometer O is attached to a microscope of the form shown in Fig. 5, and the latter is finally fastened to a fixed frame in such a position that, when the ob-

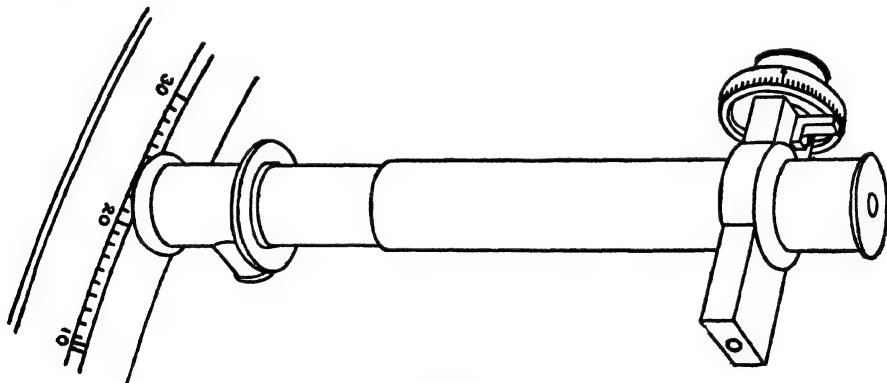
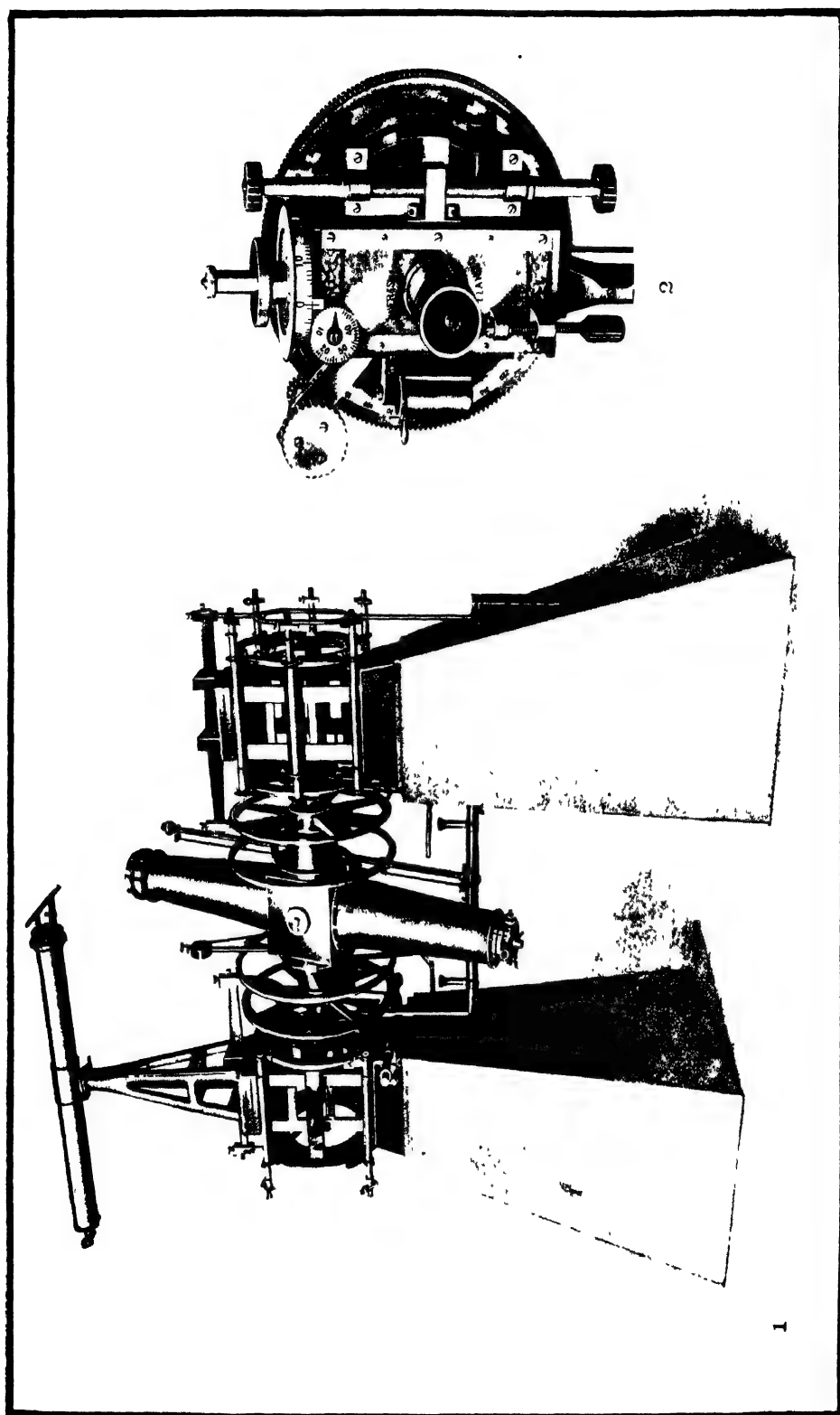


FIG. 5.

alongside of each other, as in Fig. 2; then, the observer, by moving the cross-threads from one star to the other, and measuring the amount of the motion, can determine the angular distance between the stars, and their relation to each other. This is done by a micrometer, one kind of which will now be described.

server looks into the microscope, he sees the graduations on the circle magnified as many times as necessary, and also the threads of the micrometer. The microscope being fixed remains at rest while the circle turns. If the instrument were geometrically perfect in every respect, one reading microscope would answer

ASTRONOMICAL INSTRUMENTS



1 Six-inch steel Meridian Circle, U. S. Naval Observatory, Washington, D. C.
2 Steel Micrometer for six-inch Transit Circle.

the purpose; but, as the circle cannot be centred with mathematical exactness, pairs of microscopes are used which are at opposite ends of diameters of the circle. For example, when the graduation $15^{\circ} 20'$ is brought under one microscope, the graduation $195^{\circ} 15'$ would be under the opposite one. It is customary, for greater precision, to have two such pairs at right angles to each other, or four microscopes in all.

To determine the position of the circle, and hence the direction in which the telescope attached to it points, the observer looks into one of the microscopes and fixes upon some graduation of the circle, turns the micrometer screw till a spider line, or the middle of a pair of lines is central on the graduation, and then reads the indication of the head of the screw. It will be noticed that in Fig. 5 the mark 21° is central under the microscope. By pointing his telescope on one star after another and reading the microscope in this way, noting on each occasion what graduation is read, the distance through which the telescope is moved, and therefore the angles between the stars, are measured with the highest precision.

The Clock.—The astronomical clock does not differ greatly in its construction from the ordinary clock. Its arrangement and the numbers on its face are, however, adapted to the measures of time used by astronomers. Mean solar time, which is the time we make use of in the affairs of daily life, is also used by the astronomer with a slightly different arrangement. Instead of the hours being designated as A.M. and P.M., the astronomer counts through the whole 24 hours. Moreover, the count does not begin at midnight, but at noon, which is therefore the commencement of the astronomical day. For purely scientific purposes this is the natural time to begin the day, because it is determined by the passage of the sun across the meridian. Therefore, any day of the month, as used by the astronomer, continues until noon of the following day, when a new day begins. For this reason the hour hand of his clock only makes one revolution in the 24 hours, the hours being numbered from 0 to 23. The astronomer makes use of a second system of time, entirely different from that used in daily life, being based on the apparent diurnal movement of the stars. We have explained, in the preceding article (ASTRONOMY) that the time between two passages of the same star over the meridian of a place is not quite 24 hours, but nearly four minutes less. This is the true time of rotation of the earth on its axis, because, in consequence of the advance of the earth in its orbit it must go through a little more than its true revolution in order that the meridian of any place on its surface—that of Washington for example—may again pass directly under the sun. The astronomer therefore uses a "sidereal day," which is shorter than the day determined by the sun in the proportion $365.24:366.24$. This day is divided into 24 sidereal hours, and each hour into sidereal minutes and seconds, according to the usual system. A sidereal clock is regulated so as to gain about 3 m. 56 s. every day on our ordinary clocks and, in this way, keep time with the apparent diurnal movement of the fixed stars. It is so set that it shall read 0 h., 0 m., 0 s. at the moment when the vernal equinox crosses the meridian. As any of us, by looking at the

clock, can tell, by the time of day, whether the sun is in the east, south, or west, so the astronomer, by his sidereal clock, can tell in what part of its apparent diurnal course any star may be situated. For examples, at 5 h. he knows that the constellation Auriga is on the meridian, and at 18 h. 30 m. that the beautiful Lyra is crossing the meridian.

The Chronograph.—There are two systems by which the astronomer notes the time of occurrence of an instantaneous phenomenon to a fraction of a second. On the older system, which is not without its advantages, the observer, looking at his clock, counts its beats until the occurrence of the phenomenon he is to observe. We may take, as an example, the occultation of a star by the moon. He sees the limb of the moon approaching the star until it is clear that, in a few seconds, it is going to pass over it and hide it from view. Then, looking at the clock, he listens to the seconds, mentally counting the number of each beat. At length, there is a certain beat of the clock when the star is not yet hidden, while before the next beat the star has disappeared from view. He estimates how many tenths of the interval between the beats of the clock had elapsed when the star disappeared, and records the hours, minutes, seconds, and tenths in his note-book. The skilled observer will seldom be more than a few tenths of a second in error in this estimate. It requires long practice, and much natural aptitude, to be able to make an accurate observation in this way. The method has also the inconvenience that there is no permanent record except that which is written down at the moment, so that, if the observer has made an error of any kind, he has no direct way of detecting it except by subsequently discovering that something must be wrong. This difficulty is avoided by means of a chronograph. In the form commonly used, the chronograph consists essentially of a cylinder, generally about eight inches in diameter and one or two feet in length, revolving on its axis by clock work at the rate of one turn a minute. Around the cylinder is stretched a sheet of paper, which is carried with it in its motion. The sheet is pressed by a pen, pencil, or other point, so as to leave a mark on the paper as the cylinder revolves. The pen is carried by a little carriage moving slowly forward from one end of the cylinder to the other at a rate of about one tenth of an inch, or a little more, in a minute. Consequently, the point describes a spiral line on the paper as the chronograph goes through its successive revolutions, until the pen arrives at the farther end of the cylinder. This may take a period of two, three, or four hours, according to the adjustments. The pen is connected with an electro-magnet, the current around which passes through the works of the clock. The arrangement is such that at every beat of the clock, or sometimes at every alternate beat, the electric current is either closed or broken. With each closing or breaking of the current a slight motion is given to the pen so that the seconds are marked on the paper on the revolving cylinder. The same or another current also passes through a key held in the hand of the observer. When the latter sees the moment of the phenomenon he is to note approaching, he holds the key in his hand, and presses it at the exact moment to be recorded. A motion is thus given to the pen, and the posi-

ASTRONOMY

tion of the signal on the paper among the signals given by the clock shows the moment to a fraction of a second at which the signal was given.

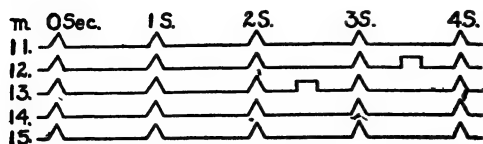


FIG. 6.

Different systems are used based on this general principle. There are various ways in which the pen marks the clock beats on the paper. In that mostly used in this country the pen is not raised from the paper, but is given a sudden lateral jerk, producing a notch in the line, as shown in Fig. 6, which is a copy of a small portion of a chronograph record. On another system the pen simply makes dots on the paper at each beat of the clock. Sometimes the current passes around the electric magnet all the time except at the instant a signal is made. Then one and the same electric circuit is used for both the clock and the observer. Sometimes the clock only makes the circuit at the moment of its beat; then the circuit at the command of the observer is a second one, which he makes by pressing the key. The main point in all systems is that the beginnings of the minutes all come under each other so that, by taking the sheet off of the cylinder, and spreading it out, writing in the minutes and the lines of seconds, the observer can determine the exact moments at which every one of any number of signals were made while the chronograph was running. For example, in Fig. 6 it will be seen that the observer pressed the key at 12 m. 3.5 s. and again at 13 m. 2.4 s.

The Spirit Level.—Another appliance much used in astronomy is the spirit level. It serves to set the axis of an instrument exactly horizontal. It consists of a glass tube, generally six or eight inches long, of which the rounded surface is not a perfect cylinder, but is formed by the revolution of the arc of a very large circle around its chord. The tube is therefore of the shape shown in Fig. 7, slightly larger in the middle part than at the two ends. The amount of bulging is, however, so slight that the eye cannot perceive it. In the most delicate levels, a section of the curved surface is an arc of a circle perhaps half a mile, more or less, in diameter. The tube is nearly filled with chloroform or ether. Water, or even alcohol,

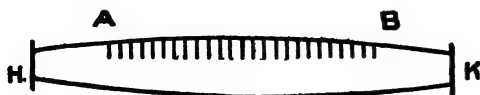


FIG. 7.

is not liquid enough for the purpose. A small vacant bubble is left at the top of the cylinder, as shown at A B in Fig. 7. When this bubble is in the middle of the tube, the axis of the level is perfectly horizontal. The remainder of the level is sketched in Fig. 8, which shows the level completely mounted, so that it can be set

on the horizontal pivots of the instrument of observation. The true horizontality of the pivots is tested by reversing the level end for end, reading the position of the bubble at each



FIG. 8.

setting. Details need not be entered into at present, as we only wish to make the principle of the instrument clear. Nearly all instruments for astronomical measurement are made by putting together some combination of the devices we have described. The two combinations most used in astronomical observatories are the Meridian Circle or Transit Circle, which are the same in principle, and the Equatorial Telescope.

The Meridian Circle.—This instrument is used for two distinct purposes. One is the determination of the right ascensions of the heavenly bodies; the other the determination of their declinations. It will conduce to clearness to consider these two functions separately and begin with the instrument as adapted to the first purpose. In this form it is called the transit instrument and is shown in Fig. 9. It consists essentially of a telescope, mounted on a

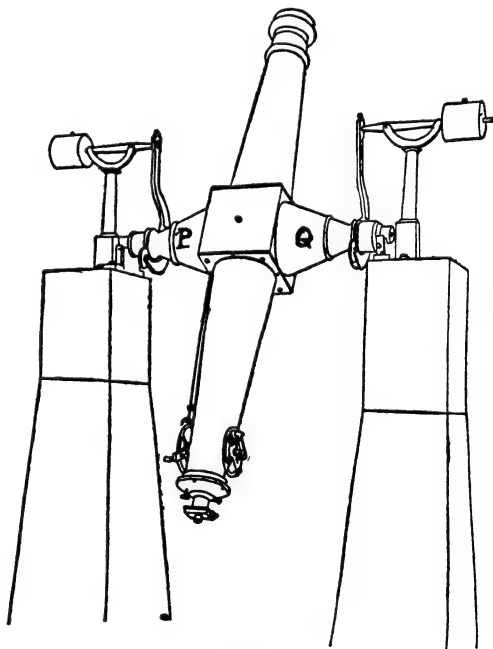


FIG. 9.

horizontal east and west axis P Q, the horizontality of which is tested from time to time by a spirit level. As thus mounted it will be seen that the telescope cannot move out of the meridian; by turning it on its axis, its line of sight marks out the meridian. Consequently, if an observer looking into it sees a star, or

ASTRONOMY

other heavenly body, he knows that the star must be near the meridian. To make the observation more exact, a system of spider lines, shown in Fig. 10, is stretched across the focal

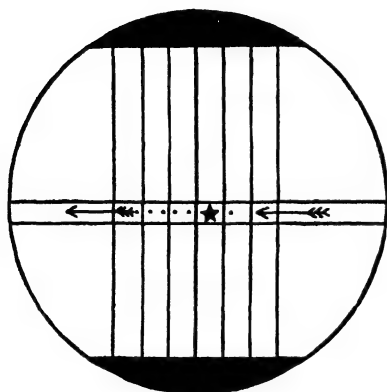


FIG. 10.

plane, as already described. The middle line is so adjusted as to mark the meridian with the greatest possible exactness. The result is that the observer, looking into the instrument, sees these spider lines, and he may also see a star moving toward the meridian by virtue of its apparent diurnal motion as shown in the figure, where it is about to cross the meridian line. Watching it with a key connected with the electric circuit of the chronograph in his hand, he taps the key at the moment the image of the star crosses each of the lines. The middle line marks the passage across the meridian. The other lines are used in order to secure greater exactness by taking the mean of all the transits across the separate lines. Thus, by pointing his instrument into any part of the meridian, the observer may determine the times by his sidereal clock at which any number of stars crossed the meridian of his place.

In order that the line of sight of the instrument may describe the true meridian, it is necessary that, when the instrument is turned in the proper direction, the line shall pass

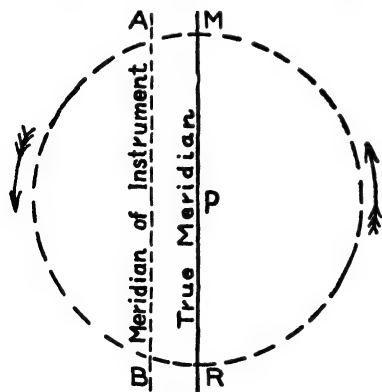


FIG. 11.

through the celestial pole. This is effected by the following arrangement: In the course of its apparent diurnal motion, a star near the pole will cross the meridian of any place twice in the

course of a sidereal day, first above the pole and then below it. Let the dotted circle in Fig. 11 be its apparent diurnal circuit around the pole P. Let the vertical line M R be the true meridian passing through the pole, and the other line A B that marked out by the line of sight of the transit instrument, supposed not to be exactly in the meridian. Then the star will take a less time in passing around from A to B on the left than in the other part of its course from B to A. Therefore by observing the transit both above and below the pole, across the middle thread of the instrument, the observer determines whether the line of sight of the instrument passes east or west of the pole and may adjust it accordingly. It may be said that, in astronomical practice, no instrument is ever assumed to be perfectly adjusted. The clock of the astronomer is never assumed to be correct, nor his transit instrument to be in the true meridian. What he does is, assuming them wrong, to make his observations, determine the errors, and correct his observations accordingly. This is called "reducing" the observation. We have already explained that, when a star is exactly in the same hour circle with the vernal equinox, its right ascension is 0 h., 0 m., 0 s. Since the clock, assumed to be correct, then reads exactly 0 h., it follows that the star in question will cross the meridian at this time by the clock. Then, as the sphere revolves, the right ascensions of the stars are all equal to the sidereal time at which they cross the meridian. Thus the observer by noting these times, measures the right ascensions of the heavenly bodies. This system of using the clock instead of a divided circle for determining right ascensions constitutes one of the greatest advances ever made in astronomical measurement. It depends upon the perfect uniformity of the earth's rotation and the excellence with which a clock can be made.

The Meridian Circle is the transit instrument, just described, with one or two graduated circles on its axis of rotation. The method of using it, and determining the arc through which the circle has moved at any time has already been explained. The inquiring reader may wish to know how, by such readings, the astronomer can determine the declination of stars. If the celestial pole were a visible point in the heavens, this would be very simple; the observer would turn his instrument until it pointed exactly at the pole, and then read his microscopes. Then as one star after another crossed the meridian, he would make a similar pointing, reading his microscope for the transit of each star. The difference between the reading on the pole and that on the different stars, would show their distances from the pole. Subtracting each of these from 90° would give the declination of the stars as seen in the instrument.

But, unfortunately, the pole is not a visible point. The observer has therefore to refer his position to the direction of gravity, which is done by a very ingenious use of a basin of quicksilver. The basin is set on a firm support on the ground under the telescope, and the latter is pointed directly downward. The observer, by mounting up to the eye-piece and looking down, is looking perpendicularly into the basin of mercury. A combination of reflectors is then arranged in the eye-piece of the

ASTRONOMY

telescope so that he can, at the same time, see the threads in his eye-piece and the images of these threads as reflected from the basin of mercury. When a telescope is so adjusted that the image and the thread coincide, he knows that the line of sight of his telescope is truly vertical. He then reads the microscope of his circle and so determines what the reading of his circle is for the vertical position. He knows that if the telescope is pointed at the zenith, the reading will be different by exactly 180° . He thus determines the exact distance at which the heavenly bodies crossed the meridian north or south of his zenith. From this, the determination of the declination is, in principle, a simple matter.

The Equatorial.—One of the most important arrangements of nature with which the astronomer has to deal is the diurnal motion. This takes place so slowly that, in looking at the stars, we do not notice it unless we watch for some time. But, if we point a telescope at a heavenly body, it magnifies the diurnal motion as much as it does the object. The result is that such a body, seen in a fixed telescope, is continually traveling across the field of view, and the instrument has to be continually moved to keep up with it.

In order to avoid this inconvenience, it is necessary that, if measures are to be made upon the body, or if it is to be continuously studied, the telescope must move to correspond. This is brought about by mounting it upon an axis parallel to that of the earth, and therefore oblique to the horizon, called the polar axis. The inclination to the horizon must be equal to the latitude of the place. All great telescopes are thus mounted. The way in which this is done will be seen by the accompanying pictures of certain great telescopes, notably that of Chicago. In order to keep the telescope pointed at the object, it must be turned upon the polar axis by clock work, moving it steadily at a rate equal to the diurnal motion of the object observed. In reality, the telescope is then pointed in a fixed direction, the motion of the earth being simply neutralized by the clock work of the telescope carrying the latter in the opposite direction. The equatorial telescope must also have a second axis, called the declination axis, in order that it may be pointed at stars in different declinations. The direction is determined by circles attached to the telescope, which show, at any time, to what declination on the celestial sphere the instrument is pointed. By a combination of contrivances, the astronomer can point his telescope by day at any star bright enough to be visible in it; or, by night, at any object invisible to the naked eye, of which he knows the right ascension and declination. He first turns his telescope until one divided circle corresponds to the declination of the star, and then clamps it in that position. Then, looking at his sidereal clock, and taking the difference between the sidereal time and the right ascension of the star, he turns his telescope on the polar axis until the other circle shows the correct pointing. Then he starts the clock work which sets the telescope in motion, and looking into the eye-piece, sees the required object. Every large telescope is also supplied with a finder. This consists of a smaller telescope fastened to the larger one in such a way that the centre of the field of view is the same in both. But the finder has a lower mag-

nifying power, and therefore a much larger field. Looking into it, and recognizing the object he wishes to observe, the observer moves the telescope until the object is seen on the cross threads of the finder. Then he knows that it is in the field of view of the large telescope.

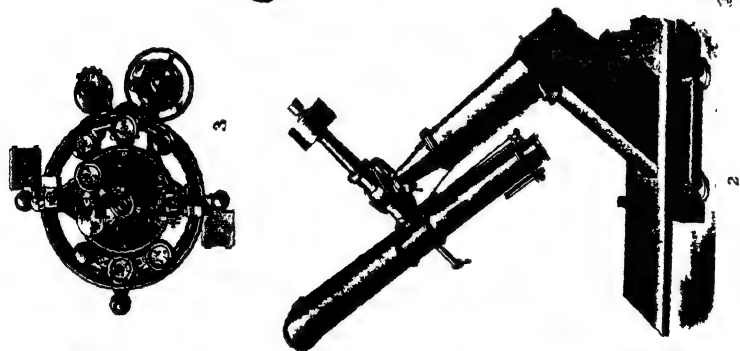
Application of Photography to Astronomy.—From the time that photographic methods were introduced, the idea of taking pictures of the heavenly bodies by such methods must have occurred to astronomers. About the year 1840, Prof. J. W. Draper of New York put this method into practice by taking a daguerreotype of the moon. Shortly after our present system of photography was devised, several American astronomers carried the experiment yet farther. Notable among these were G. P. Bond, first assistant and afterward director of the Harvard Observatory; and L. M. Rutherford of New York, who was the possessor of an excellent telescope, and brought the method to a high state of perfection.

The principle on which a photograph of a heavenly body is taken is extremely simple. A telescope is pointed at the body so that the image of the latter is formed in its focus. A sensitized plate is placed in the focus and exposed for the necessary time. This may be only a fraction of a second, or it may be several hours. Unless the exposure is very brief, it is necessary that the telescope shall be kept in motion, so as to follow the object in its apparent diurnal course. When the exposure is completed, the image is developed in the usual way. In photographing, the ordinary telescope, as used for eye observations, is not well suited to the purpose, for the reason that the chromatic aberration is not the same for the visual and for the photographic rays. It is necessary to have a somewhat stronger crown lens, or a weaker flint lens, if a telescope is to be used in photographing, than if it is to be used by the eye. But the necessity of having telescopes of the two kinds is now, to a certain extent, done away with by the use of sensitized plates which are especially sensitive to the visual rays. By putting in an absorbing screen, through which the rays must pass before they reach the focus, and which allows only the visual rays to pass, very accurate photographs can be taken by the plates. This defect is felt only in the refracting telescope. A reflecting telescope brings all the rays, of whatever color, to one and the same focus, and therefore may be used either for photographing or for seeing. Improvements made in recent times in the sensitiveness of photographic plates have given an enormous extension to this method in astronomy. It is now found that celestial objects completely invisible to ordinary vision can be photographed. While only a few thousand nebulae have been catalogued as visible to the naked eye, it is found that there are hundreds of thousands which admit of being determined by photography.

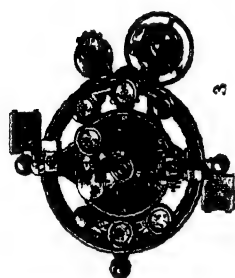
The latter is now employed for two distinct purposes. The first is simply that of forming a picture of the sky, or rather of the stars in the sky. For this purpose the best telescope is one as large as can conveniently be obtained, but of short focal length. A great enterprise in this direction was started in 1887 by an association of astronomers who met at the Paris Observatory, and put into operation a plan of photographing the entire heavens on from 10,000



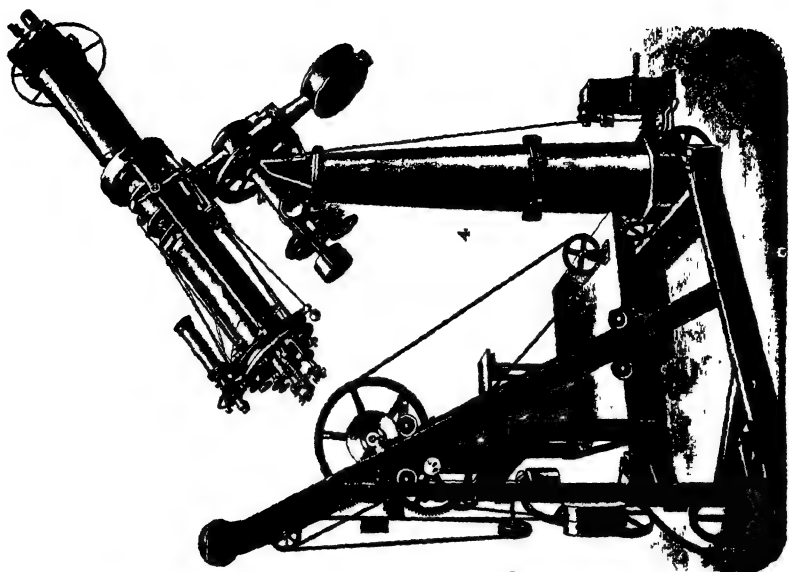
1. Equatorial in the Observatory at Pultowa



2. Photographic Refractor.



3. Eye Piece of No 4



4. Helometer.

ASTRONOMY

to 20,000 plates, each two degrees square. This work is now approaching completion, and is intended to form a permanent record of the starry heavens, as they are seen in our times. A similar object is reached on a different system at the Harvard Observatory. There photographs are being constantly taken with telescopes much shorter than those used for the international chart. In this way new stars are from time to time discovered, and variations in the light of different stars are brought out. The other purpose is that of exact measurement. When the astronomer had to determine the respective distances of stars in the same field of view, he has hitherto generally depended on the filar or other micrometer. The use of this instrument is laborious. When the photographic method is used, he simply takes a picture of the stars he wishes to measure, and, at any convenient time, places it under a measuring engine supplied with sliding microscopes, and measures off the distance on his negative. The result of these two applications is that photography is now slowly supplanting eye observations in an important fraction of the astronomical work of the world.

SIMON NEWCOMB, LL D.,
Washington, D. C.

Astronomy, Theoretical. This branch of the science grows out of the great discovery of Newton, that the motions of the heavenly bodies, especially those of the solar system, are determined by their mutual gravitation. The results of this theory are now worked out by purely mathematical methods with a degree of precision scarcely attainable in any other branch of science. The adopted method consists first in expressing the attraction or pull experienced by each body from all the others in the form of differential equations. These equations express, in the most general way, the acceleration which the planets experience at every moment from the attraction of the other bodies. We do not write them because they would be understood only by a reader expert in the calculus, who, if he desires to be acquainted with them, will consult special treatises. It will suffice to say that there are three differential equations for each planet, which express the attraction, and its effect on the motion of the planet at any instant, in the direction of three co-ordinates. The problem then becomes the purely algebraic one of integrating these equations. The result of this process is that the effect of the attraction or pull upon the body, through a period of days, years, or even centuries, is summed up with great exactness, so that the motion of the body through the whole period can be expressed by algebraic equations. The simplest case occurs when there are only two bodies. The integration shows that, in this case, the bodies revolve round their common centre of gravity in orbits each of which is an ellipse. Commonly it is necessary to consider only the motion of the smaller of the two bodies, the motion being defined as if the larger were at rest. This is the case of a planet revolving round the sun, or of a satellite round its primary. It is then found that the orbit described by the revolving body round the great central body is an ellipse having the latter in one of its foci. The motion is also found to be subject to two other laws which bear the name of Kepler, their first discoverer. One of these is that the radius vector,

that is to say, the line drawn from the central body to the other sweeps over equal areas in equal times. The result of this is that if A B be the orbit having the sun, S, in the

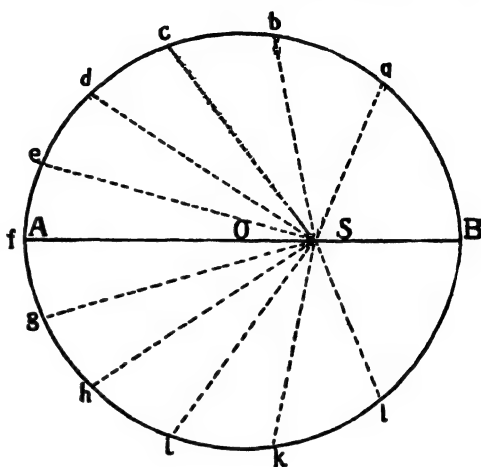


FIG. 12.

focus; and if we mark on the orbit the points *a*, *b*, *c*, etc., which the planet passes through at any equal intervals of time, and then draw lines from each of these points to the sun, the areas included between these lines will all be equal to each other. A glance is sufficient to show that the nearer the body is to the sun the more rapidly it must move.

The position of the orbit and the place of the body in it are determined by six quantities called *elements*. Two of these elements express the position of the plane in which the ellipse lies, and therefore in which the planet moves. These are the inclination of the plane of the orbit to some other plane taken as that of reference. For the latter is commonly adopted the plane of the ecliptic, in which the earth revolves round the sun. When the inclination of the orbit of any other planet is spoken of, the astronomer means the angle which the plane of its orbit makes with the plane of the ecliptic. The other of the two elements expresses the line passing through the sun along which the two planes intersect. This is called the Line of Nodes. The position of the node is defined by the angle, as seen from the sun, between the vernal equinox and that node where the planet crosses from the south to the north side of the ecliptic. Three other elements determine the size and form of the elliptic orbit, and its position in its plane. The semi-major axis, A B, of the ellipse is called the mean distance of the planet from the sun, it being half the sum of the greatest and least distances. The other of these elements is the eccentricity of the orbit, which is equal to the quotient obtained by dividing the distance of the sun, O S, from the centre of the orbit by O A, the semi-major axis. These two elements completely determine the ellipse. The exact position of the ellipse in the plane may then be defined by the angle which the semi-major axis, O A, makes with the line of the nodes. It will be seen that the point A is that at which the planet is

ASTRONOMY

nearest to the sun. This is called the perihelion of the orbit if the central body is the sun; if the earth is the centre, the perigee. The opposite point, B, where the planet is most distant, is called the aphelion, or apogee. Finally, the sixth element is the position of the planet at some given moment of time.

The time of revolution of the planet is given by Kepler's third law, which is that the squares of these times are proportional to the cubes of the major axes of their orbits. For example, let one planet be four times as far as another from the sun. The cube of 4 is 64. The square root of this is 8. It follows that the planet which is four times as far will be eight times as long in completing its circuit. If the outer planet went as rapidly as the other, it would be only four times as long. Its orbital motion is therefore, on the average, only about half as rapid.

In theoretical astronomy a unit of distance is necessary. Our ordinary units do not well serve the purpose of the astronomer for two reasons. They are too short for the great distances he has to measure, and the magnitude of the heavens in terms of miles is not known with sufficient exactness to make that measure convenient. What the astronomer does therefore is to take the mean distance of the earth from the sun as his yardstick, and to express the distance of all the bodies of the solar system, both from the earth and from each other, the moon sometimes excepted, in terms of this unit.

From the laws of motion based on gravitation may be derived several interesting theorems. Finally, suppose, that at some point in the solar system,—we may take, to fix the ideas, a point at the mean distance of the earth from the sun,—a number of bodies are projected in different directions, but all with the same velocity. Then, the equations of motion show that the major axes of the orbits which these bodies describe will all be equal. Then, from Kepler's third law it follows that the times of revolution will also be equal. Consequently, at the end of a certain period the bodies will all return at the same moment to the point from which they started. This period will depend only on the velocity with which the body is projected. There is a certain velocity, called the circular velocity, which is such that if the bodies are projected in a direction at right angles to that of the sun, they will describe circular orbits. If all the bodies are projected in different directions with this same velocity, they will all be exactly one year in getting around and returning to the starting point. Now suppose that, instead of the bodies being projected with this circular velocity, which is very nearly that of the earth in its orbit, they are projected with a somewhat smaller velocity. Then, the less the velocity the less the major axis of the orbit, and the greater the velocity the greater the major axis. A body projected with a speed one-third greater than that of the earth would fly out beyond the orbit of Jupiter. A slightly greater speed would carry it beyond the orbit of Neptune, the reason being that, as the body recedes, the attraction of the sun diminishes at so rapid a rate that the weak attraction left is not sufficient to overcome the slight surplus velocity. Finally, if the speed is equal to that of the earth mul-

tiplied by the square root of 2, that is to say, about 26 miles per second, the body will never return. The ellipse in which it should move is stretched out into a parabola, still having the sun in its focus. If the velocity is greater than this, the parabola will be still farther changed into a hyperbola. Then the body would fly out into the stellar spaces, perhaps in the course of millions of years reaching some other sun, but would certainly never return to our system. Another theorem is that the velocity, no matter what the form of the orbit, diminishes as we go out from the sun in proportion to the square root of the distance. Thus we have already seen by Kepler's third law, when we found from that law that a planet four times as far from the sun would move only half as fast. Thus the parabolic velocity is less the farther a body is from the sun. At the planet Uranus it is less than six miles per second; at that of Neptune, about five miles per second. Still another theorem is that if a planet moving in a circular orbit were stopped at any point of its motion, and then were allowed to drop toward the sun, the time of reaching the sun would be equal to that of revolution divided by the square root of 32. It follows that if the earth should be stopped in its motion, it would drop to the sun in a number of days found by dividing 362.24 by the square root of 32. This would be nearly 64 days.

The orbits of most of the large planets are nearly circular. For particulars relating to them see SOLAR SYSTEM. The orbits of comets are, however, mostly parabolas, or ellipses which cannot be distinguished from parabolas when the comet is near enough to the sun to be visible. It is probable that many of those orbits which are ellipses have become so through the comet at some time in its history passing very near a planet. (See COMET.) One of the problems of theoretical astronomy which the astronomer often meets with is that of determining the orbit of a newly discovered body of the solar system. Three complete observations of such a body, that is to say, three observations each of which determines exactly the apparent position of the body on the celestial sphere, enable the astronomer to determine the orbit in which it is moving round the sun. The calculation requires from five to ten hours' work by an expert calculator having at his command the necessary tables. The first orbit thus computed may be considerably in error, because the effect of errors of observation is multiplied many fold, unless the planet has moved through a considerable arc of its orbit between the times of observation. But the longer the planet is observed, the more exactly the elements of its orbit can be determined. It is found that when two stars are so near each other as to be kept together by their mutual attraction, they revolve around each other in an elliptic orbit. It follows that the law of gravitation extends to these systems. Thus the calculations of the theoretical astronomer are not confined to the solar system, but may be extended to the fixed stars.

In all that precedes we have considered only the motion of two bodies, the smaller of which moves around the larger in an elliptic orbit. But, as a matter of fact, every planet of the solar system is acted upon not only by the great central body, but by every one of the other

ASTRONOMY

planets. The result is that the actual orbit, although very nearly an ellipse, deviates slightly from it, and the motion is not exactly in accordance with Kepler's laws. The problem of taking account of these additional forces is an extremely complicated one, in which success has been reached only by successive generations of the ablest mathematicians devoting long years of study and calculation to the subject. While the solution, even to-day, is far from complete, it has been so far advanced that it is possible to prepare tables of the motions of the planets which shall hold good for generations, and even for centuries. The method in which the problem can best be solved was devised by Lagrange, who flourished in France toward the latter part of the 18th century. The fundamental idea of his method was that the motion of the planet at every instant should be represented by an ellipse, but this ellipse continually changes its form and dimensions so as to fit in with the actual motion of the planet under the influence of the attraction of all the other planets. Some idea of the case may be imagined by supposing a cord of some light material made into an ellipse very nearly a circle, and left to float on the waves of the ocean. Then we should see the cord, while still remaining almost in its original shape, continually bending and twisting as it was moved by the waves. So does the variable ellipse in which the planet moves. It is exactly defined by supposing that, at any one instant, the attraction of all the other bodies, the sun excepted, ceases. Then the planet would move in a fixed and unchangeable ellipse. This ellipse is taken as that which corresponds with the motion of the planet at the instant. At a second instant the planet would actually have deviated slightly in consequence of the attraction of the other planets, but there would still be a corresponding ellipse, but somewhat different. So the ellipse goes on changing continually.

When these changes are subjected to the rigor of mathematical formula, it is found that they nearly, but not quite, compensate each other in the long run. Let us take, for example, the eccentricity of any one orbit. This will vary in the course of every revolution of the planet, and may come back to its original amount any number of times. But, if we watch it revolution after revolution, we shall find that, in the long run, it continually increases or diminishes. It is thus found that the eccentricity of the earth's orbit has been diminishing through all historic times, and this diminution will go on for 43,000 years to come. Moreover, the general rule is that the perihelion of the planet is gradually moving forward. In the case of the earth's orbit the motion is such as would carry it all the way round the circle in 200,000 years. The inclinations and longitudes of the nodes are also varying in the same way. These variations, which go on century after century, are called secular variations, while those which are compensated from time to time are called periodic. Now, the most interesting and important question of celestial mechanics is whether the secular variations will continue forever in the same direction. The profound analysis of Laplace and Lagrange shows that such will not be the case so far as the eccentricities are concerned.

At the end of immense periods the direction will be reversed. It is now known that the diminution of the eccentricity of the earth's orbit after continuing for about 43,000 years will change to an increase for a certain period. It is thus with all the orbits; the motions go through a series of oscillations having periods of hundreds of thousands of years—like "great clocks of eternity which beat ages as ours beat seconds." The precision with which the astronomer is now able to predict the motions of the heavenly bodies is reached by a combination of mathematical computations of the most difficult and complicated character, with the most refined observations upon the positions of the moon and planets, year after year.

The most complex of all the problems is that of the moon's motion around the earth, of which we shall mention some features. In this case the central body, the earth, is vastly smaller than the sun. But, owing to the great distance from the sun and the consequent small difference in the force of its attraction upon the earth and moon, it happens that the moon revolves around the earth in an orbit which approximates to an ellipse. But the changes and motions in this ellipse are much larger and more rapid than in the case of the planets. For example, the perigee of the moon's orbit makes a revolution round the earth in eight years, while the node on the ecliptic makes a revolution in 18.6 years. The moon also makes two swings back and forth during the space between two full moons, and the eccentricity and perigee both make an annual swing, all owing to the action of the sun. See MOON.

The principles of theoretical astronomy, and the operations of practical astronomy are combined in one of the greatest achievements of the human intellect—that of measuring the heavens and weighing the planets, and, in a few cases, even the fixed stars.

The distance of the moon is determined in two ways, the results of which agree within the necessary range of uncertainty of the methods. One is by the measurement of the moon's parallax, taking as the base line two distant observatories, Greenwich and the Cape of Good Hope. (See PARALLAX.) The other method consists in determining exactly what ought to be the size of the moon's orbit in order that she may make her revolution around the earth in the time that she actually does. The probable error of the distance of the moon at any time, as determined in this way, is not more than 40 or 50 miles.

The proportions between the orbits of the several planets are known with the greatest exactness from their observed times of revolution, and from Kepler's third law. It follows that if we can get the exact distance of any one planet at any one time, all the other distances in the solar system may be derived by the known proportion. The fundamental quantity which is used as a unit of measure is the distance of the sun. This distance has been determined by four completely separate and independent methods, the agreement between which illustrates the great exactness of astronomical theory.

The first method is by measures of parallax. The application of this method is fully described in the article PARALLAX. It requires that the apparent direction of a planet among the stars

ASTRONOMY

be observed with great exactness from two far distant points of the earth's surface, or at two times of day during the interval between which the observer is carried around by the rotation of the earth. These observations have to be on a planet and not on the sun, because the latter, owing to the brilliancy of its light, cannot be measured with the necessary precision. The most celebrated way of determining parallax has been by observing transits of Venus (q.v.). But these occur at such rare intervals, the last having been in 1882, and there being no other to occur during the 20th century, that the measures have to be made on other planets which approach nearest to the earth. For this purpose Mars has sometimes been used, because it occasionally approaches us within less than half the distance of the sun. But the most exact observations can be made on some of the minor planets at the time of their nearest approach.

The second method is by the velocity of light. This method is, in principle, the most simple and elegant of all. It rests on the fact that it is possible, by two kinds of observation, to determine how long it takes light to pass from the sun to the earth, or to cross the earth's orbit. If then we can determine by measures on the earth's surface how fast light travels, it follows that by multiplying this velocity by the time it takes to travel from the earth to the sun, we shall have the distance of the sun. The velocity of light has actually been determined with great precision by means of the revolving mirror. (See LIGHT, VELOCITY OF.) The result is a speed of 186,300 miles per second. The time required for light to cross the earth's orbit is much more difficult to determine. The only way in which a direct determination can be made is through observations of the eclipses of Jupiter's first satellite. By comparing the times of these eclipses through a long series of years when Jupiter is at various distances from the earth, it is found that the eclipses are seen later, the farther Jupiter is from the earth at the time. This is because light requires time to travel over the different distances. But the determinations made in this way are not very exact, because such eclipses take place so gradually that it is impossible to fix upon a precise phase without a possible error of several seconds. All we can say as a result of this method is that it takes about 4 m. 20 s. for light to pass from the sun to the earth.

A more exact result is reached by measuring the displacement of the fixed stars produced by aberration. As the earth makes its annual course around the sun, the position of every star in the heavens is, at every moment, slightly displaced toward the direction in which the earth is, at the moment, moving. This is due to the proportion between the velocity of light and the speed of the earth in its orbit. Unfortunately, the speed is so great that the displacement in question is only about 20.5"; an arc too small to be determined with the precision that is desirable. Still, the observations available are so numerous that the result, 20.525", found by Chandler, is probably within one, or, at most, two hundredths of a second of the truth. Accepting Chandler's number, light requires 500 seconds to pass over the distance which separates the sun from the earth. Multiplying this by the speed of light, we have, for the distance

of the sun $186,300 \times 500 = 93,150,000$ miles as the distance of the sun.

The third method is a very recondite one, because it rests on the mathematical principles of celestial mechanics, applied to the case of the earth's motion around the sun. It requires, in advance, an exact determination of the ratio of the mass of the sun to that of the earth. This is best found by observations of Venus, which now extend through more than a century and a half, by which the motion of the node of Venus on the ecliptic is determined. This motion is due principally to the attraction of the earth; and from it the proportion between the mass of the earth, and that of the sun is determined. The next step requires a comparison between the distance which a body falls at the surface of the earth from its own gravitation, and the fall of the earth toward the sun as shown by the curvature of its orbit. By combining these various ratios, the distance of the sun is calculated. The fourth method also rests the theory of gravitation. One consequence of the sun's action on the moon is that the latter falls behind about two minutes in its monthly course near the time of the first quarter, and is ahead by the same amount near the last quarter. Knowing the exact amount of this swing, the distance at which the sun must be placed in order to produce it is determined. Each of these four methods has its strong and its weak points; and there is no one of them so much better than all the others that we can rely upon it exclusively. Still, their agreement affords a remarkable proof of the accuracy of astronomical theory, and of the precision with which astronomical measures are made under such difficulties as the observer and computer have to encounter. The astronomer does not use the distance of the sun in his computations, because, as already remarked, this is simply his unit of length. What he actually uses is the sun's parallax; this is equal to the angle which the equatorial radius of the earth subtends when seen at a distance equal to that of the sun. The latest results for this parallax from the four methods are the following.

First method, parallax, 8.802".
Second method, light, 8.779".
Third method, mass earth, 8.762".
Fourth method, moon, 8.773".

The general conclusion which we reach is that the distance of the sun is very nearly 93,000,000 miles, probably a little more, rather than a little less.

What may seem a yet more wonderful result of celestial measurement is the weighing of the planets and other heavenly bodies. This requires very complex mathematics. But, after all, the principles on which the method rests can readily be made clear. In the case of the planets, there are two methods, one of which can be applied only when a planet has a satellite moving around it. We have already seen that the motion of every planet which, were there no other planet, would take place in an ellipse having the sun in a focus, is changed by the attraction of the other planets. The observation of the deviations, when carefully measured through many revolutions of a planet, enable the mathematical astronomer to compute the ratio of the mass of each attracting planet to that of the sun. This ratio is all that the astronomer requires for his ordinary work.

ASTROPALIA—ASYLUM

When the planet has a satellite, its mass can be determined with much more ease and simplicity. The measurement of the distance of the satellite from the planet, carried through a great number of revolutions of the former, enable the astronomer to determine the ratio between the distance of the satellite from the planet, and that of the earth from the sun. Combining this with the time of revolution of the planet, a proportion is shown between the mass of the planet and that of the sun by a law of the same form as the third law of Kepler. The masses determined by astronomical methods are all expressed by taking the mass of the sun as the unit. To translate the result into our ordinary measures of weight, we must know the mass of some one body, say the earth, in pounds or kilograms. How this is done is set forth in the article GRAVITATION.

SIMON NEWCOMB, LL.D.,
Washington, D. C.

Astropalia, or **Stampalia**, an island of the Ægean Sea, belonging to Turkey, 77 miles west-northwest of the island of Rhodes. It has a length of 13 miles and an area of 50 square miles. Its ancient name was *Astypalæa*.

Astrophyl'ite, a mineral crystallizing in the orthorhombic system, and consisting of an orthosilicate of iron and manganese, combined with titanium, sodium, and potassium. It is yellow and strongly pleochroic. It has a sub-metallic pearly lustre, a hardness of 3, and a specific gravity of from 3.3 to 3.4. It occurs at Brevik, Norway, at Kangerdluarsuk, Greenland, and near Pike's Peak, Col. Its name signifies "stellate leaf," the allusion being to the stellate way in which its crystals are sometimes arranged.

Astruc, *as'truk'*, **Jean**, French physician: b. 19 March 1684; d. Paris, 5 March 1766. He acquired high reputation as an anatomist, and was the author of 'Venereal Diseases' (1736), and other medical works. The work, however, which has immortalized him is purely theological and is entitled 'Conjectures as to the Original Materials of Which Moses Seems to Have Availed Himself in Composing the Book of Genesis' (1753). In this he divides the book of Genesis into two parts, on the ground of the use of *Elohim* (God) or *Yahveh* (Jehovah). He holds that these two names for the Deity point to the fact that Genesis was compiled from two parallel, independent documents. His memoir forms the origin of modern criticism on the Pentateuch.

As'trup, **Eivind**, Norwegian explorer: b. Christiania, 1870; d. 1896. He was a member of the first and second Peary expeditions, 1891 and 1893, and made the first survey of the northern coast of Melville Bay. He perished while on a snowshoe expedition from Dovre, Norway.

Astulphus, **Aistulf**, or **Astolf**, king of the Lombards in 749-56 A.D. He conquered the exarchate of Ravenna in 752, but was deprived of it in 755 by Pepin the Short.

Astura, *äs-too'ra*, a maritime village of Italy, 40 miles from Rome. In its little harbor a high tower is said to stand on the site of the villa of Cicero, where Cicero was slain by order of Antony 43 B.C.

Vol. 2—8

Asturias (*as-too'ria*), **The**, a former principality of Spain. To this mountainous country of the north of Spain the Goths retreated in the 8th century before the sword of the Saracens. The inhabitants of Asturia are said to be less industrious than the Galicians, and less sociable than the Biscayans. The hereditary prince of Spain has borne since 1388 the title of Prince of Asturia, or of the Asturias, according to the obsolete division into Asturia de Oviedo and Asturia de Santillana, Oviedo and Santillana being the two chief cities of the principality. Since 1838 the principality has been officially known as the province of Oviedo. See OVIEDO.

Asty'ages, the last king of Media, reigned 594-559 B.C. In the latter year he was dethroned by Cyrus, who, according to Herodotus, was his grandson. Cyrus revolted in 559, and defeated Astyages, whom he took prisoner, but afterward appointed governor of Hyrcania.

Asuncion, *ä-soon'the-ön*, or **Nuestra Señora de la Asuncion** (in English, *Assumption*), the capital of Paraguay, on the river Paraguay. The principal edifices are the cathedral, several other churches and convents, the president's palace, house of congress, arsenal, custom-house, a college, hospital, railway station, etc. The trade of the town is in Paraguay tea, tobacco, fruits, hides, timber, provisions, manufactured goods, etc. Steamers and sailing vessels ply on the river. The town was founded on the feast of the Assumption in 1537, hence its name. Pop. (1900) 51,700.

Asurnazirpal, *ä-soor-na'zer-pal*, a king of Assyria from 881 B.C. to 860. He was one of the most warlike of Assyrian kings, and in numerous campaigns enlarged his empire, especially toward the westward, extending it from Lebanon to the Tigris. He also rebuilt Calah, his capital, and left a record of his achievements in the so-called 'Standard Inscription.'

Aswal, *äs'wāl*, a Hindu name of the sloth-bear (q.v.).

Asylum, a place where persons flee for protection. Under the Mosaic dispensation cities of refuge were set apart to which the slayer might flee so that innocent blood should not be shed, in case the person was not worthy of death—that is, in case the act was accidental and not malicious. But among the ancients, outside of the Jews, it seems that temples, statues to the gods, and altars particularly consecrated for such purposes, constituted places of refuge for persons generally, and it was deemed an act of impiety to remove, forcibly, one who had fled to such an asylum for protection. However, Tiberius abolished all asylums except the temples of Juno and Æsculapius. These asylums finally passed over to the Christian world, and under Constantine the Great, all Christian churches were made asylums for all those who were pursued by officers of justice or the violence of their enemies, and the younger Theodosius, in the year 431, extended these privileges to all courts, gardens, walks, and houses belonging to the Church. In the year 631 the Synod of Toledo extended the limits of asylums 30 paces from every church, and this privilege afterward prevailed in Catholic countries, and it is said to have been a strong armor of defense against the wild spirit of the Middle Ages, and

ASYLUM — ATAHUALPA

not without good consequences at the time when force often prevailed against justice. But in later times as other and better systems of procedure in the administration of justice became adopted, asylums were abolished in most countries. This seems to have been the origin, nature, and object of asylums, and such the common acceptance of the term, but more recently in some countries, the name has been given to institutions for the protection and care of the poor, blind, deaf and dumb, and lunatics who are incapable of taking care of themselves.

Asylum, Right of, in international law, the right which forbids one government to apply its laws to its own or its enemy's subjects when they are within the jurisdiction of another government. Most commonly this right is accorded to a foreign legation to shelter persons subject to the jurisdiction of the state where the legation is situated. It is universally conceded that the right of asylum is not to be applied in the case of ordinary criminals, but it is usually made use of for the protection of political offenders.

Asymmetric (as-i-met'rik) **System**, in crystallography, the crystal form now more commonly called "trilic." It was called asymmetric because it has no plane of symmetry. See CRYSTAL.

Asymptote, äs'im-tôt (from three Greek words, meaning "not to fall with" or coincide), a term used in geometry to designate a line which continually approaches another line, but never meets it, however far either of them may be prolonged. At least one of the lines must be a curve. Though the very existence of such a line seems paradoxical, it can be demonstrated on the strictest mathematical principles, as in the case of the hyperbola and its directrix. The term first occurs in the conic sections of Apollonius.

At Odds, the title of a novel by the Baroness d'Aulphœus (1863), dealing with the vicissitudes of a Bavarian family during the stormy epoch from Hohenlinden to Wagram. It is told with a happy ease and directness; and if it has not the brilliancy of 'The Initials,' is not less clever as a study of character.

Atacama, ä'tä-ka'ma, the name, formerly, of two South American provinces: (1) A northern province of Chile, with an area of 28,380 square miles, and a population (1895) of 59,713. About 1,000 silver and 250 copper mines are worked, and gold is also found in considerable quantities. Salt deposits cover sometimes 50 square miles. Copper, to the value of over \$7,500,000 annually, is the chief export to England. Capital, Copiapo. (2) A Bolivian Department, which formerly extended as far north as Peru, and east to Argentina. All that part of the district west of the Andes was ceded, in 1884, to the Chileans, and formed into the Department of Antofagasta, with an area of 60,770 square miles. The recently discovered mines of Caracoles are said to be the most productive silver mines in the world. The former capital, Cobija (pop. 2,380), was long the only port in the district; but the rival port of Antofagasta, founded in 1870, had by 1894 attained a population of 7,946.

A'taca'ma, a desert region on the west coast of South America, formerly belonging partly to Bolivia, partly to Chile, but now belonging wholly to the latter. It lies between the Andes and the sea and much of it at the height of 3,000 to 5,000 feet above the sea. The desert of Atacama proper, a tract almost entirely destitute of water and vegetation, lies partly in the Antofagasta territory of Chile, partly in the province of Atacama. The soil consists of stones and gravel, and the surface is diversified with many mountains. The Salina of Atacama, a salt morass, mostly dried up, has a surface of 1,084 square miles, and lies at the height of over 7,000 feet.

Atacamite, -tak'-, a mineral, originally found as sand in the Atacama province, in northern Chile. It is essentially a hydroxy-chloride of copper, having the formula $\text{CuCl}_2 \cdot 3\text{Cu}(\text{OH})_2$. It crystallizes in the orthorhombic system, and has a hardness of from 3 to 3.5, and a specific gravity of 3.76. Atacamite is green in color, and commonly occurs in masses of slender prisms. A coating having the same chemical composition is formed on metallic copper, as the result of prolonged exposure to sea-water or air. Atacamite exists in considerable quantity in various parts of South America, and in Australia; and has been used to some extent as a source of copper. In the United States it is found very sparingly at Jerome, Ariz., and elsewhere.

Atahualpa, a'ta-wal'pa (*atahu*, Latin *virtus*, and *allpa*, sweet), a Peruvian Inca (see INCA SEMI-CIVILIZATION and PERU). His brother Huascar succeeded Huayna Capac; but Atahualpa obtained the kingdom of Quito, and a civil war broke out between the brothers; though the details are not accurately known, it appears that when Pizarro was beginning to move inland Huascar had been defeated and thrown into prison, and Atahualpa had become Inca. Pizarro set out in September 1532, and made for Cassamarca, where the Inca was. On 15 November Pizarro entered Cassamarca, and sent to request an interview with the Inca. On the evening of the next day, Atahualpa entered the great square of Cassamarca, accompanied by some five or six thousand men, while Pizarro's artillery and soldiers were planted in readiness in the streets opening off the square. The interview was carried on by the priest Vicente de Valverde, through an interpreter. He stated briefly and dogmatically the principal points of the Christian faith and the Roman Catholic policy, and concluded by calling upon Atahualpa to become a Christian, obey the commands of the Pope, give up the administration of his kingdom, and pay tribute to Charles V., to whom had been granted the conquest of these lands. To this the Inca at first returned a very temperate answer. The priest retired, and Pizarro at once gave the signal for attack. The Spaniards rushed out suddenly, and the Peruvians, astonished and defenseless, were cut down in hundreds. Atahualpa, thus treacherously captured, offered an enormous sum of money as a ransom, and fulfilled his engagement; but Pizarro still detained him, until the Spaniards should have arrived in sufficient numbers to secure the country. While in captivity, Atahualpa gave secret orders for the assassina-

ATAKAPA — ATCHAFALAYA

tion of his brother Huascar, and also endeavored to raise an army to expel the invaders. His plans were betrayed, and Pizarro at once brought him to trial. He was condemned to death, and, as being an idolater, to death by fire. Atahualpa, however, professed himself a Christian, received baptism, and his sentence was then altered into death by strangulation. His body was afterward burned, and the ashes conveyed to Quito. Consult Prescott, 'Conquest of Peru.'

Atakapa, a'tā-kā'pā, the designation of an extinct cannibal tribe who occupied the west gulf coast of Louisiana.

Atala, a'tā'la', a romance of the American wilderness, by Châteaubriand, published in 1801. It is the extravagant and artificial but beautiful story of two lovers—a young Indian brave, Chactas (that is, Choctaw), and an Indian maiden, Atala.

At'alan'ta, the name of two heroines in Greek mythology. One was a native of Arcadia, celebrated for her skill in archery. She slew with her arrows the Centaurs Rhœcus and Hylæus, sailed to Colchis with the Argonauts, and was present at the chase of the Caledonian boar, which she first wounded; hence Meleager awarded to her the prize. She was renowned for her beauty and swiftness in running. She stipulated that every candidate for her hand should run a race with her, and if he conquered her she was his own, but if he was conquered he was doomed to death at her hand. Many had fallen victims in the attempt, when Meilanion, by the aid of Aphrodite, overcame her. The goddess gave him three golden apples, which he threw behind him, one after another, as he ran. Atalanta stopped to pick them up, and Meilanion reached the goal before her. She accordingly became his wife. The other Atalanta, who cannot very well be distinguished from the preceding, the same stories being told about both, is connected with Boeotia and Boeotian localities. She is said to have been married to Hippomenes. See Morris, 'Atalanta's Race.'

At'alan'ta in Cal'ydon, a tragedy by Algernon Charles Swinburne, published in 1864. It deals with a Greek theme, and employs the Greek chorus and semichorus in its amplification. To this chorus are given several songs, which exemplify the highest charms of Swinburne's verse—his inexhaustible wealth of imagery, and his flawless musical sense. The story is founded upon the hunting of the Caledonian boar.

At'aman. See HETMAN

Atavism (Latin *atavus*, originally "ancestor," later specialized as "great-great-grandfather") in biology, the reappearance in an organic being of specific ancestral peculiarities which have not appeared in intermediate generations, or of peculiarities of ancestral side branches not represented in the direct line. It is often loosely used as synonymous with reversion, but in strict scientific usage the latter is not the reappearance of single characteristics, and certainly not of abnormal ones, but the return in general type to the primitive type from which the special race was evolved. In this sense, it may be said that reversion is the extreme

backward limit of atavism. For example, the birth of a six-fingered child with a six-fingered grandfather or uncle but normal parents would be atavism; but the approach of human beings left on a desert island to the prognathous and hairy type of the simians, were it conceivable, would be reversion. Sometimes the two are hardly to be discriminated; thus, the appearance of a tail-bone or pointed ears would be an atavism recalling the primitive type, as are horses with toes, yet not quite a reversion. A true reversion is the banded pigeon which is a frequent "sport" among fancy breeds; and the still commoner mongrel "yellow dog," a reversion to the jackal type. Atavisms are part of the perpetual family wonders, the reproduction of minute special features, habits, tricks of behavior, even tastes and fashions of speech, characteristic of distant relatives or far-back ancestors, but perhaps obliterated for long periods. In sociology, especially criminology, the word is used precisely in the sense of reversion to primitive instincts and passions, supposed to be overlaid or suppressed by civilization. The criminal on this theory is a being who has lost his evolved characteristics, and gone backward to the primitive savage. This, however, has too many flaws to be scientifically acceptable.

Atax'ia, an irregularity of function, but the term is usually applied to incoordination of muscular movements. It is a phenomenon seen in many disordered states of the body and not confined to the one disease, locomotor ataxia. Thus, ataxia is a common symptom of alcoholic intoxication. Two forms of ataxia may be distinguished, static and motor. In static ataxia there is an irregularity in the maintenance of attitudes and positions. This form of ataxia is common in chronic cocaine poisoning and is present in some severe cases of chorea, or St. Vitus' dance. The patients' limbs seem to give way beneath them and there is a restless irregularity in attitude and pose. Static ataxia is also a symptom in certain types of insanity, notably the disease termed catatonia. Motor ataxia is a much commoner form of this condition. In alcoholic intoxication it is well developed and the loss of control, largely due to diminution of the function of the sensory nerves, is too well known to need description. In a number of diseases of the nervous system ataxia of the muscles of the arms, lips, tongue, trunk, and lower limbs is a prominent symptom. Ataxia is to be distinguished from loss of the sense of equilibrium. See CEREBELLUM; CO-ORDINATION; EQUILIBRIUM; HEMIPLEGIA; LOCOMOTOR ATAXIA; SCLEROSIS.

Atbara, at-ba'ra (*Bahr-el-Agwad*, or Black River), an important tributary of the Nile. It rises in Abyssinia to the northwest of Lake Tzana, flows to the north, receiving several large tributaries, especially the Mareb and Tacazzé, and enters the Nile lat. 17° N.

Atchafalaya, äch'ä-fa-lī'ya, a river in Louisiana, an outlet of the Red River. It flows southward through Grand Lake, and enters the Gulf of Mexico by Atchafalaya Bay. Its length is estimated at 250 miles and it is supposed to have been formerly the principal channel of the Red River.

ATCHISON — ATHABASCA

Atch'ison, David Rice, American legislator: b. Frogtown, Ky., 11 Aug. 1807; d. 26 June 1886. He was educated for the bar, and began practising in Missouri, in 1830. He was elected to the legislature in 1834 and 1838; was appointed judge of the Platte county circuit court; and, in 1843, while holding this office, was appointed United States senator to fill a vacancy. He was twice elected to the last office, and during several sessions was president *pro tem.* of the Senate. During Sunday 4 March 1849, he was the legal President of the United States, as Gen. Taylor, the President-elect, was not sworn into office until the following day. Senator Atchison became conspicuous in the slavery debates and in the Kansas-Nebraska struggle, because of his strong pro-slavery views. The city of Atchison, Kan., was named after him.

Atch'ison, Kan., a city and county-seat of Atchison County; on the Missouri River and the Atchison, T. & S. F., the Burlington Route, the Chicago, R. I. & P. and the Missouri P. R.R.'s. It is an important commercial center, by reason of its excellent river and extensive railroad facilities, and has a wholesale trade of more than \$50,000,000 per annum. It exports largely grain, flour, live stock, and dressed meats, and has more than 50 important manufacturing establishments. There are gas, electric light, sewer, water and electric railway plants; several public parks; a noteworthy bridge across the Missouri River; an attractive union depot; three national banks; and daily, weekly, and monthly periodicals. Atchison is the seat of the State Soldiers' Orphans' Home, Well's Insane Asylum, Allaman's Hospital, Midland College (Lutheran) and St. Benedict's College (Roman Catholic), and has a public library, public high and graded schools, and a number of high graded private schools. Atchison was first settled in 1854 and was incorporated as a city in 1859. Pop. (1900) 15,722.

Ate, *ā'te*, among the Greeks, the goddess of hate, injustice, crime, and retribution. Expelled from Olympus she has ever since paced the earth with incredible velocity, and spread destruction and misery everywhere.

At'eles, a genus of South American monkeys of the division with long prehensile tails, to which the name *Sapajou* is sometimes collectively applied. The head is round, and the facial angle about 60 degrees; the limbs are remarkably long and slender, upon which account the English name of spider monkey is sometimes used as a generic designation; the fore-limbs are either destitute of a thumb or have a rudimentary one.

Ateles'tite, a native basic arsenate of bismuth, having the formula $3\text{Bi}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$. It is yellow in color, and translucent with an adamantine lustre. It occurs in small monoclinic crystals, at Schneeberg, Saxony.

Ateliers Nationaux, *a-tě-līā' na'syō'nō'*, national workshops established by the provisional government of France in 1848. Previous to the outbreak of the revolution of Feb. 1848, there had been two years of scarcity, inundation, and commercial crisis. *Ateliers nationaux*,

or national workshops, were opened at once. The workmen were organized under lieutenants and brigadiers of their election. The number of applicants, including arrivals from the provinces, at length exceeded 100,000, and the total expense reached nearly 16,000,000 francs. The men were employed on roads, railways, earth-works, etc., but it was impossible to find work for the whole, and a great part of the labor was unprofitable. There were besides 30,000 to 40,000 women employed in preparing articles of outfit for the army, whose work left only a trifling loss. In June the Constituent Assembly resolved upon the immediate closing of the ateliers. This rash step provoked the insurrection of the Red Republicans (23d-26th June), suppressed by Gen. Cavaignac with fearful slaughter. In Lyons the ateliers were closed without disturbance, but in some other towns trouble was occasioned.

At'ella'næ Fab'ulæ (called also *Oscan plays*), a kind of light interlude between tragedy and comedy, performed by freeborn young Romans. This kind of a play is said to have originated in *Atella*, a city of the Oscans, between Capua and Naples, and is at the same time the beginning and all that remains of a national Italian comedy, consisting of farce seasoned by satire.

Atesh'ga (the place of fire), a place much revered by Persian fire-worshippers. It is on the peninsula of Apsheron, on the west coast of the Caspian, and is visited by large numbers of pilgrims, who bow before the sacred flames issuing from the bituminous soil.

Ath, at, a town of Belgium, 14 miles from Mons. It has important manufactures of linen, lace, cutlery, soap, and large hammers. It was formerly a fortress. Pop. (1900) 11,100.

Ath'a, a false prophet in the reign of the Caliph Mehedy, or his predecessor, Al-mansur. He taught the doctrine of metempsychosis, and claimed to be an incarnation of divinity. He had lost one of his eyes, on account of which he always wore a veil, whence he received the epithet of Mokanna. He is the hero of Moore's "Veiled Prophet of Khorassan" in 'Lalla Rookh'.

Athabasca, *āth'a-bās'ka*, the name of a river, pass, lake, and district in northwestern Canada, between the Rocky Mountains and Hudson Bay. The river has its sources in the eastern slopes of the Rocky Mountains, pursues a tortuous course to the north, till it falls into Lake Athabasca; length about 600 miles. Athabasca Pass is in the Canadian Rocky Mountains between Mounts Brown and Hooker. Lake Athabasca, or Lake of the Hills, is about 200 miles in length from east to west, and about 35 miles wide at the broadest part. Its waters are carried off by the Great Slave River, with which it communicates by several small streams issuing from its western end. The north shore is high and rocky, and thickly wooded with firs and poplars, etc.; the south shore is level. The district of Athabasca, formed in 1882, and enlarged in 1895, lies immediately east of British Columbia, and north of Alberta district; area about 251,300 square miles. It is watered by the Athabasca and the Peace River, and contains the Lesser Slave Lake, and other smaller sheets.

ATHALIAH — ATHANASIUS

Ath'ali'ah, the daughter of Ahab, king of Israel, and wife of Joram, king of Judah. She was a woman of abandoned character, and fond of power, who, after the death of her son Ahaziah, opened her way to the throne by the murder of 42 princes of the royal blood. She reigned six years; in the seventh the high priest Jehoiada placed Joash, the young son of Ahaziah, on the throne of his father. Athaliah, attracted by the noise of the people who were crowding to the coronation of Joash, entered with them into the temple, where the ceremony was going on. At the sight of the new king, surrounded by priests, Levites, great officers of the kingdom, and the joyful people, she was beside herself; she tore her hair, and cried out, "Treason!" Jehoiada ordered her to be immediately led from the temple by the officers, and commanded that all who should offer to defend her should be slain; but she was put to death at the gate of the palace without opposition. The altars of Baal, which she had erected, were thrown down, and the worship of God restored (about 877 B.C.) (2 Kings viii. ix.). This story is the theme of Racine's 'Athalie,' written at the request of Madame de Maintenon.

Athalie, a'ta-le, a famous tragedy by Racine, based on the Bible story of Athaliah. It was first performed in 1600. Rachel won her greatest triumphs in this play.

Ath'amas, the son of Æolus, and husband of Nephelê, the cloud goddess. Their children were Hellê and Phryxus. Being afterward separated from Nephelê, he had by Ino, his second wife, Learchus, Melicertes, and Eurycleia. Athamas, having lost his reason through the anger of Hera, and taking Ino and her children for a lioness and her whelps, seized Learchus and dashed him against a stone; while Ino, with Melicertes in her arms, plunged into the sea, and became the sea goddess Leucothea, Melicertes being transformed into Palænon, a divinity worshipped by sailors. Athamas now abandoned Boeotia and fled to Phthiotis, where he built Alos, and united himself with Themisto.

Athan'agild, the 14th king of the Spanish Visigoths, who succeeded Agila in 554, and died in 566. Being threatened by Agila, he applied for aid to Justinian, emperor of the East, who sent troops, and Athanagild defeated his adversary, who was obliged to retire to Merida. Athanagild was re-established at Toledo, which he made his capital.

Athan'aric, a king of the Visigoths in Thrace about the middle of the 4th century: d. Constantinople, 25 Jan. 381. The emperor Valens made war upon him and compelled him to sue for peace, but Athanaric would not come upon the Roman territory to sign the treaty, while Valens thought it beneath his dignity to visit the barbarian at home. Accordingly a bridge of boats was constructed across the Danube, and the two potentates met in the middle. In 380 he was compelled to flee to Constantinople, where Theodosius received him hospitably, and gave him a small pension until his death. See Hodgkin, 'Italy and Her Invaders,' Vol. I. (1880).

Athanasian (ăth'a-nă'zhăn) **Creed**. See CREED.

Athanasius (ăth'a-nă'zhî-ŭs) **Saint**, Bishop of Alexandria, a celebrated Greek theologian: b. Alexandria about 296; d. 373. He had a Christian education, and came into the family of Alexander, afterward archbishop of Alexandria. Alexander took him to the council at Nice, where he gained the highest esteem of the fathers by the talents he displayed in the Arian controversy. About 326 he became bishop of Alexandria. The complaints and accusations of his enemies at length induced the emperor Constantine to summon him in 334 before the councils of Tyre and Jerusalem, but his judges could do nothing, however, further than suspend him from his office. He still continued in the discharge of his duties until the emperor, deceived by new falsehoods, banished him to Treves. The death of Constantine put an end to this banishment at the end of a year and some months. Constantius, emperor of the East, recalled the holy patriarch. His return to Alexandria resembled a triumph. The Arians made new complaints against him, and he was condemned by 90 Arian bishops assembled at Antioch, while 100 orthodox bishops, assembled at Alexandria, declared him innocent. Pope Julius confirmed this sentence, in conjunction with more than 300 bishops assembled at Sardis from the east and west, and in consequence of this he returned a second time to his diocese. But when Constans, emperor of the West, died, and Constantius became master of the whole empire, the Arians ventured to rise up against Athanasius. Athanasius, displaced for a third time, fled into the deserts of Egypt. His enemies pursued him even here, and set a price on his head. To relieve the hermits who dwelt in these solitary places, and who would not betray his retreat, from suffering on his account, he went into those parts of the desert which were entirely uninhabited. He was followed by a faithful servant, who, at the risk of his life, supplied him with the means of subsistence. In this undisturbed spot Athanasius composed many writings, full of eloquence, to strengthen the faith of the believers, or expose the falsehood of his enemies. When Julian the Apostate ascended the throne he allowed the orthodox bishops to return to their churches. Athanasius therefore returned after an absence of six years. The mildness which he exercised toward his enemies was imitated in Gaul, Spain, Italy, and Greece, and restored peace to the Church. But this peace was interrupted by the complaints of the heathen, whose temples the zeal of Athanasius kept always empty. They excited the emperor against him, and he was obliged to flee to Thebais to save his life. The death of the emperor and the accession of Jovian again brought him back; but Valens becoming emperor eight months after, and the Arians recovering the superiority, he was once more compelled to flee. He concealed himself four months, until Valens, moved by the pressing entreaties and threats of the Alexandrians, allowed him to return. From this period he remained undisturbed in his office until he died, 373. Of the 46 years of his official life he spent 20 in banishment, and the greater part of the remainder in defending the Nicene Creed. Athanasius is one of the greatest men of whom the Church can boast. His deep mind, his noble heart, his invincible courage, his living faith,

ATHAPASCAN STOCK—ATHENAGORAS

his unbounded benevolence, sincere humility, lofty eloquence, and strictly virtuous life, gained the honor and love of all. His voluminous writings, which are chiefly controversial and dogmatical, treat of the mysterious doctrines of the Trinity, the incarnation of Christ, and the divinity of the Holy Spirit. His 'Apology Against the Arians,' addressed to the emperor Constantine, is a masterpiece. The creed which goes under his name was not written by him, but belongs to a later time. (See CREED.) The most complete edition of his works is that published at Padua in 1777 (4 vols. folio).

Bibliography.—Bright, 'Lessons from the Lives of Three Great Fathers' (1890); Farrar, 'Lives of the Fathers' (1889); Fisher, 'History of Christian Doctrine' (1896); Harnack, 'History of Dogma,' Vol. IV. (1898).

Athapascan Stock (also *Tinnch*), of American Indians, and one of their most numerous and widely distributed linguistic and ethnological groups. The type-name is taken from a northwest Canadian group, the western Montagnais; but the tribes are scattered from Alaska to Mexico. The original stock were semi-arctic, along the Yukon and Mackenzie, fierce and energetic, but of a low type of culture; and spread southward by conquest on both sides of the Rocky Mountains. They are divided into three chief groups, the northern, the Pacific, and the southern. The first are those in the original home,—northwest Canada and interior Alaska,—Montagnais, Montagnards, Chipewyan, Kutchin, etc. These number about 8,500. The second are those of Washington, Oregon, and California, except the Thlinket coast tribes, which extend along the Alaskan coast also. These are few and scattered tribes, about 900 souls in all. The southern, and far the most important, comprises some 23,500, mostly of the great Apache and Navajo confederacies, also the Jicarillas and Mescaleros, and the Lipan, of Mexico.

Atharvana, at'har'vāṇa, the fourth of the Indian Vedas. Its language is more modern than that of the other three. The theological treatises, regarded as 52 in number, called Upanishads, are appended to the Atharvan Veda.

Atheism, the denial of the existence of a God. Among the Greeks atheism consisted in a denial or non-recognition of the gods of the State. Socrates was put to death for asserting the superiority of the divine wisdom to the other gods, as the ruler and disposer of the universe, thus contradicting Greek mythology, which assigned that office to Zeus. In Latin times atheism still continued to be a negation, with no pretension to rank as a system. It was closely akin to that cultured unbelief which extensively prevailed among the Humanists during the early part of the Renaissance. The atheism of the 18th century was a protest against current religious hypocrisy; and, like its predecessors, put forward little or nothing to replace the system it attempted to destroy. The atheism of the 19th century may be taken to include every philosophic system which rejects the notion of a personal Creator; in this sense it ranks as a genus, of which Atomism, Pantheism, Positivism, etc., are species. Strictly, it is the doctrine that sees in matter the sole principle of the universe. Popularly, athe-

ism consists in the denial of a God; this view is probably founded on the mistranslation of Psalms xiv. 1, and lvi. 1, which should be, "The fool hath said in his heart, No God for me," that is, he wilfully rejects God, at the same time knowing that he is.

Ath'el, or **Æthel**, an Old English word signifying noble, eminent, not only in blood or by descent, but in mind. It is frequently a part of Anglo-Saxon proper names.

Ath'eling, a title of honor among the Anglo-Saxons, meaning one who is of noble blood. The title was gradually confined to princes of the blood royal, and in the 9th and 10th centuries applied exclusively to the sons or brothers of the reigning king. It was first conferred on Edgar by Edward the Confessor, his grand-uncle, who bestowed it when he designed to make him successor to himself on the throne.

Athelney, äth'el-nī, a marshy island in Somersetshire, England, about seven miles southeast of Bridgewater. It is formed by the junction of the rivers Parret and Tone. Alfred the Great established a fortified post here during a Danish invasion, and afterward founded an abbey which has entirely vanished.

Ath'elstan, a Saxon monarch, the first to assume the title of king of England. He succeeded his father, Edward the Elder, in 925, and died in Gloucester, 27 Oct. 940. He was victorious in his wars with the Danes of Northumberland, and the Scots, by whom they were assisted. After a signal overthrow of his enemies at Brunanburh (937) he governed in peace and with great ability. In his reign a law was passed conferring the rank of thane on every merchant who had made three sea voyages on his own account. He died in 940.

Ath'e'na. See MINERVA.

Ath'enæ'um, the general name of temples to Athena, but more especially applied to the temple at Athens, frequented by poets, learned men, and orators. Instruction was also given there to the youth, and in later times the name was applied to all places of education for the young. The same name was given at Rome to the celebrated school which Hadrian established on the Capitoline Mount about 135 A.D. Many learned men received ample salaries for giving instruction in this institution, and that they might be enabled to study at leisure. Here also learned men assembled to exchange ideas.

Ath'enæus, a Greek rhetorician and grammarian, who lived at Naucratis, in Egypt, then at Alexandria, and afterward at Rome, at the end of the 2d and beginning of the 3d century after Christ. He has left an encyclopedic work in the form of conversation, called the 'Feast of the Learned' (Deipnosophistæ), a rich but ill-arranged treasury of historical, antiquarian, philosophical, grammatical, and other knowledge. The principal editions are those of Schweighäuser (1801-7); Dindorf (1827); Meineke (1859-67).

Ath'enag'oras, a Christian philosopher of Athens, who wrote in Greek an 'Apology for the Christians,' addressed to the emperor Marcus Aurelius, in 177. This work defends the Christians from the accusations brought against them by the heathens (of atheism, of incest, of

ATHENAIΣ — ATHENS

eating murdered children, and the like), with a philosophical spirit and in a lively and forcible style.

Ath'ena'is, or **Eudocia**, empress of the East, daughter of the Athenian philosopher Leontius: b. Athens about 393-4 A.D.; d. Jerusalem about 465. Athenais gaining the favor of Pulcheria, sister of the emperor Theodosius, a youth of 20 years of age, presently became the wife of Theodosius and was persuaded to receive baptism by the name of Eudocia. By Theodosius she had a daughter, Eudoxia, who was married to Valentinian III., emperor of the West. She was indisposed to submit to the authority of Pulcheria, who virtually ruled the empire of the East, and a quarrel ensued, in which Eudocia had for a time the ascendancy; but the jealousy of her husband being aroused, the authority of Pulcheria was restored, and Eudocia was permitted to retire to Jerusalem. When her daughter and granddaughters were taken prisoners by Genseric she became reconciled to the orthodox Church.

Athene, a-thé'ne. See MINERVA.

Athe'ne, Temple of. See ÆGINA.

Athen'odo'rus, a Greek sculptor of the Rhodian school, who, with his father, Agesander, and Polydorus, executed the celebrated group of the "Laocoon."

Ath'ens, Ala., county-seat of Limestone County, situated on the Louisville & N. railroad, 107 miles south of Nashville, Tenn., 85 miles north of Birmingham. Athens has a cotton factory, knitting mill, sash, door and blind factory, two large lumber mills, State Agricultural School; Athens Female College, under ownership and direction of North Alabama Conference, Methodist Episcopal Church south. Has five churches for whites and several churches for colored population, and two newspapers. Surrounded by a splendid agricultural country and has many advantages. City owns and operates water and light plant and the town has an excellent sewer system. City also owns and operates a dispensary.

ROBERT M. RAWLS,
Editor 'Alabama Courier.'

Ath'ens, Ga., a city and county-seat of Clarke County, on the Oconee River, and the Central of G., the Georgia, the Northeastern of G., and the Seaboard A. L. R. R.'s, 67 miles east of Atlanta, the State capital. It is in a cotton-growing region; has a large trade in that staple; and contains cotton and woolen, cotton-seed oil, bobbin, and hosiery mills, iron works, furniture factories, and other industrial plants. It is the seat of the University of Georgia, the State College of Agriculture and Mechanic Arts, Lucy Cobb Institute, Knox Institute, Jeruel Academy, and a State Normal School. There are electric light and street railway plants, two national banks, several hotels, and daily, weekly, and monthly periodicals. The assessed property valuation exceeds \$6,000,000. Athens was first settled in 1801. Pop. (1904) 14,000.

Ath'ens (ancient Greek, *Athēnai*), the capital of the kingdom of Greece, anciently the capital of the State of Attica and the centre of Greek culture. Its origin and early history are

shrouded in darkness. It is situated in the central plain of Attica, about four miles from the Saronic Gulf or Gulf of Athens, an arm of the Ægean Sea, running in between the mainland of Greece and the Peloponnesus. The site is irregular, the city having been built on and around several hills rising from the plain, Mount Lycabettus, on the northeast, overlooking the whole. The principal eminence within the city boundary was the Acropolis, the site first built on; west from the Acropolis was a lower hill, called the Areopagus; southwest from the Areopagus was the Pnyx and south from the Pnyx the Museum; toward the sea on the south the view was unimpeded. On the east of the city was the stream known as the Ilissus, and on the west the Cephissus. The Acropolis was often called Polis or the city, from its having formed the original nucleus of the town, while the whole city, or sometimes only the lower city, as distinct from the Acropolis, was called Astu. In the Areopagus and the line of hills that run north and south to the west of it traces of numerous dwellings cut in the rocks have recently been found. At its most flourishing period, in the 5th century B.C., Athens was connected with its port-town Piræus and the harbors of Piræus and Munychia by two massive walls 550 feet apart, while a third wall ran to the less important harbor of Phalerum. The first was considered the most convenient, and was one of the emporiums of Grecian commerce. The surrounding coast was covered with magnificent buildings, whose splendor vied with those of the city. The walls of rough stone which connected the harbors with the city were so broad that carriages could go on their top. The Acropolis contained the most splendid works of art of which Athens could boast. Its chief ornament was the Parthenon or Temple of Athena Parthenos (the Virgin). This magnificent building was 228 feet long, 101 broad, and 66 high. It was built under the administration of Pericles, and finished in 438 B.C. It was of the Doric order of architecture, and was built of marble, resting upon a basement of limestone. It had columns on all sides, 8 at either front and 17 at the sides, counting the corner columns twice. These columns were fully six feet in diameter at the base, and 34 feet high. The structure was adorned both within and without with statues, reliefs, and other sculptures. Inside the temple stood the statue of Athena by Phidias, a masterpiece of art, nearly 40 feet high, the unclothed portions formed of ivory, the drapery of plates of gold, the weight of which was estimated at 44 talents. The Propylæa, a magnificent building, built of white marble, formed the entrance to the Acropolis, of which it covered the whole western end. A splendid marble stair, 70 feet broad, led up to the Propylæa. The chief building on the Acropolis, in addition to the Parthenon and the Propylæa, was the Erechtheum, a kind of double temple, especially sacred to Athena Polias (or Athena, guardian of the city), and Erechtheus, or Poseidon. On the Acropolis also were other temples, altars, statues, etc., including a colossal bronze statue of Athena Promachos, 50 or 60 feet high. On the south slope of the Acropolis were the theatre of Dionysus, the Odeum of Pericles, and the later Odeum of Herodes, the latter two buildings being intended for musical competitions. In

ATHENS

the lower city the greatest pieces of architecture were the temples of Theseus and Olympian Zeus, one of which stood on the northwest, the other on the southeast side of the Acropolis. The first was of Doric architecture, and resembled the Parthenon. On the metopes of this temple the famous deeds of Hercules and Theseus were excellently represented. The temple of Zeus Olympius was of Corinthian architecture, and was the largest temple in Athens, and the greatest ever erected to the supreme deity of the Greeks. It was begun by Pisistratus, and continued from time to time until at length, after 700 years, it was finished by Hadrian. The outside of this temple was adorned by 120 fluted columns, 60 feet high, and 6 feet in diameter. It was 354 feet long and 171 broad. Other structures deserving of notice were the Horologium of Andronicus Cyrrhestes or the "Temple of the Winds," the choragic monument of Lysicrates, and the Stoa Poikilē or gallery of paintings. Besides these wonderful works of art Athens contained many other places which must always be interesting from the recollections connected with them. Such a spot was the renowned Academy where Plato taught, lying about six stadia north of the city, and consisting of a gymnasium surrounded by walks, groves, and fountains. Such a place was the Lyceum, where Aristotle taught, and which, through him, became the seat of the Peripatetic School. It lay on the bank of the Ilissus, opposite the city, and was also used for gymnastic exercises. Not far from thence was the less renowned Cynosarges, where Antisthenes, the founder of the Cynic School, taught. The sects of Zeno and Epicurus held their meetings in the city. Zeno chose the well-known Poikilē, and Epicurus established himself in a garden within the walls, for he loved both society and rural quiet. Not only literary, but political assemblies gave a particular interest to different places in Athens. Here was the court of Areopagus, where that illustrious body gave their decisions; the Prytaneum or senate-house; the Pnyx, where the free people of Athens deliberated. After 23 centuries of war and devastation, of changes from civilized to savage masters, have passed over this great city, its ruins still excite astonishment. The northern wing of the Propylæa is still tolerably perfect, and the inner wall, with its five gateways leading into the Acropolis, still stands. The Parthenon remained almost entire till 1687, when it was much injured by an explosion of gunpowder during the siege of Athens by the Venetians. It is now a magnificent ruin. Its two pediments represented, respectively, the contest of Poseidon and Athena for Athens and the birth of the goddess, while the metopes represented a number of events in which the goddess or heroes connected with Athens took part. A great number of these sculptures are now in the British Museum. In the whole of this mutilated building we find an indescribable expression of grandeur and sublimity. Near the Propylæa is the small but elegant temple of Nikē Apteros (Wingless Victory), which having been destroyed in 1687, was re-erected in 1835 from its remains. There are also astonishing remains to be seen of the Erechtheum, especially the beautiful female figures called Caryatides, supporting the roof of the southern portico. The

Temple of the Winds is still tolerably perfect. Its form is an octagon: on each side it is covered with reliefs, which represent one of the principal winds. The choragic monument of Lysicrates also remains. It consists of a pedestal surrounded by a colonnade, and is surmounted by a dome of Corinthian architecture. Outside of the city are the lofty ruins of the temple of the Olympian Zeus. Of 120 pillars 16 remain, but none of the statues are in existence. The pedestals and inscriptions are scattered here and there, and partly buried in the earth. The main body of the temple of Theseus has remained almost entire, and it now contains a collection of ancient sculpture. On the hill where the famous court of Areopagus held its sittings are to be seen steps hewn in the rock, places for the judges to sit, and over against these the stations of the accuser and the accused. The hill became a Turkish burial-ground, and is covered with monuments. The Pnyx, the place of assembly for the people, not far from the Areopagus, is very nearly in its primitive state. One may see the place from which the orators spoke hewn in the rock, the seats of the scribes, and at both ends the places of those officers whose duty it was to preserve silence, and to make known the events of public deliberations. The niches are still to be seen where those who had any favor to ask of the people deposited their petitions. The spot occupied by the Lyceum is only known by a quantity of fallen stones. The ground occupied by the gardens of the Academy is still well cultivated and fertile. The long walls are totally destroyed, though the foundations are yet to be found on the plain. The Piræus has scarcely anything of its ancient splendor, except a few ruined pillars scattered here and there, though it promises to become a handsome modern town, and has again a harbor filled with shipping, engaged in carrying on a considerable trade. The most thorough investigation of the places among the ruins of Athens worthy of attention is contained in Leake's 'Topography of Athens, with Some Remarks on its Antiquities' (1821, with an atlas in folio; 2d ed. 1841). Other valuable works on the same subject are such as Stuart and Revett's 'Antiquities of Athens' (1762-1816); Dodwell's 'Tour Through Greece'; Wordsworth's 'Athens and Attica'; Curtius' 'Attische Studien'; Dyer's 'Ancient Athens'; and Wachsmuth's 'Die Stadt Athen in Alterthum.' Ancient Athens is believed to have had a population of not more than 200,000.

Athens was at no time so splendid as under the Antonines, when the magnificent works of from eight to ten centuries stood in view, and the edifices of Pericles were in equal preservation with the new buildings. Plutarch himself wonders how the ancient structures could retain such a perpetual freshness. Pausanias, who traveled in Greece at this time, that is, in the 2d century after Christ, has left a valuable account of the state of Athens as he saw it. Many of the edifices of later times were due to foreign potentates, rulers of Pergamus, of Egypt, of Rome. But after a time the wholesale robberies of collectors, the removal of great quantities of the works of art, first to Rome and then to Constantinople, Christian zeal, and the attacks of barbarians, made sad

ATHENS — ATHERTON

inroads among the monuments. When Justinian closed the schools of the philosophers in 529, Athens soon ceased to be a centre of intellectual activity. The Parthenon was turned into a church of the Virgin Mary, and Saint George stepped into the place of Theseus. In 1456 Athens fell into the hands of the Turks, under whom the Parthenon became a mosque. When it was selected as the capital of the modern kingdom in 1833, it had only a scanty population inhabiting a scene of ruins.

Modern Athens lies mostly northward and eastward from the Acropolis, and consists of well-built streets, the most important being Piræus, Athens, Stadion, and University. Among the principal buildings are the royal palace, the university, the academy of science and art, the polytechnic, the national museum, the observatory, the chamber of deputies, exhibition buildings, new theatre, and new library. The palace (1838-43) is a conspicuous but unattractive building of limestone with marble portico. The National University, founded in 1837, is a handsome structure, with a large number of teachers and an attendance of over 2,000 students. The academy is a beautiful building faced with Pentelic marble; the new National Library is also a fine building, containing over 200,000 volumes, and so is the Polytechnic School, part of which is occupied as a museum, and contains the Schliemann and other collections. Saint Nicodemus, the largest and finest of the Byzantine churches (62 feet long by 45 wide), dates from the 11th century. Athens is well equipped with educational institutions, possessing besides the National University and Polytechnic School, a number of high schools, a gymnasium, a school for the higher education of girls and female teachers, orphanages for boys and girls, and four foreign archaeological schools or institutes, the French, German, American, and British. The city is governed by a mayor elected every four years, with a council of 18 members. There is a municipal fire department and the city controls the gas, electric light and waterworks, but the water supply is so inefficient that the inhabitants are obliged to have recourse to water-carriers. Street cars cross the city in all directions and it is an important railroad centre. The bathing resort of Phaleron, adjoining the Fort of Piræus, is connected with Athens by a suburban railroad. The city has very little manufacturing, although the financial centre of the kingdom, and its trade is concerned chiefly with its own requirements. Pop. (1896) 111,486.

Athens, Ohio, a town and county-seat of Athens County, situated on the Baltimore & O. S. W., the Toledo & O. C., the Hocking V. & T., and the Kanawha & M. R.R.'s. Athens was settled in 1797, and in 1811 was incorporated. The government is by a mayor, elected every two years, and a village council. The town owns and operates the waterworks. It is the seat of Ohio State University (q.v.) and of the Southeastern Ohio Insane Asylum, and manufactures lumber and brick. Pop. (1900) 3,066.

Athens, Tenn., a town and county-seat of McMinn County, on the Southern R.R. half way between Knoxville and Chattanooga, 56 miles to either city. The town was incorpor-

ated in 1868. It has woolen mills, spinning mills, lumber factories and two newspapers. It is the seat of Grant Memorial University (q.v.). Pop. (1904) 2,600.

W. T. LANE,
Editor 'Athens Post.'

Athens, Texas, city and county-seat of Henderson County; at the junction of the Saint Louis & S. and the Texas & N. O. R.R.'s., 75 miles from Dallas. It is an important manufacturing town and has pressed brick, fire brick and tile works, cotton oil mills, potteries, and other industries. There are excellent public schools, four churches, and two national banks. Athens was first settled in 1850 and was incorporated as a city in 1901. Pop. (1900) 3,200.

Athens of America, a name frequently applied to Boston, Mass., on account of her intellectual and literary pre-eminence.

Athens of the North, a name given to Edinburgh, Scotland, on account of the picturesque of the site and beauty of architecture, as well as intellectual distinction. Copenhagen also is often so called.

Athens of the West, a name given to Cordova, Spain, the centre of Arab learning and culture in the Middle Ages.

Athens, American School at, an institution for classical study, founded in Athens, Greece, in 1882. It is a branch of the Archaeological Institute of America, and is managed by a committee representing various colleges in the United States which contribute to its support. The building was erected by means of private subscriptions, on grounds donated by the Greek government, and the institution has an endowment of \$50,000.

Atherine, a small fish, from five to six inches long, called also the sandmelt.

Atheroma, a term sometimes applied to the process of arteriosclerosis as a whole, but best restricted to that type of chronic degeneration of the blood vessels associated with softening of the tissues and their infiltration with the necrotic products, fat cholesterol, etc. See ARTERIES, DISEASES OF.

Atherton, Charles Gordon, American politician: b. Amherst, N. H., 1804; d. Manchester, N. H., 15 Nov. 1853. He was graduated from Harvard in 1822, was a member of the New Hampshire legislature for five years and speaker of the lower house for four, and in 1837-43 was a Democratic representative from New Hampshire in Congress. In 1843-9 and 1852-3 he was a member of the Senate. On 11 Dec. 1838 he introduced in the house the so-called "Atherton gag" resolution, which provided that all bills or petitions on the subject of slavery should be "laid on the table without being debated, printed, or referred." The resolution was passed by a vote of 126 to 73, and remained in effect until 1844. It was resolutely opposed by J. Q. Adams, who advocated the "right of petition." Adams was ultimately victorious, and on 3 Dec. 1844 the 21st rule of the House, providing that no paper praying the abolition of slavery or the slave trade should be in any wise entertained, was abolished by a vote of 108 to 80. See GAG-RULES.

Atherton, George William, American educator: b. Boxford, Mass., 20 June 1837. He worked his way through Phillips Exeter Acad-

ATHERTON—ATHLETICS

emy and Yale College; was professor of political economy and constitutional law in Rutgers College, N. J., in 1869-82; was admitted to the bar of New Jersey in 1878; and became president of the Pennsylvania State College in 1882.

Ath'erton, Gertrude Franklin (HORN), American novelist: b. San Francisco in 1857. Since the death of her husband she has chiefly pursued a literary career, and has resided in London since 1894. She has written 'The Doomswoman' (1892); 'Before the Gringo Came' (1894); 'A Whirl Asunder' (1895); 'Patience Sparhawk and Her Times' (1897); 'American Wives and English Husbands' (1898); 'The Californians' (1898); 'A Daughter of the Vine' (1899); 'The Valiant Runaways' (1899); 'Senator Worth' (1900); 'The Aristocrats' (1901); 'The Conqueror' (1902); 'The Splendid Idle Forties' (1902), a revision of 'Before the Gringo Came.'

Ath'erton, a manufacturing town of England, Lancashire, 13 miles northwest of Manchester, containing cotton-factories, collieries, iron-works. Pop. (1900) 16,200.

Ath'erton Res'olu'tions. See GAG RULES.

Athetosis, a peculiar movement, usually of the hands and fingers, occurring after some destructive process in the brain. It is seen in the young who have suffered severe injuries at birth and sometimes following an apoplectic stroke.

Ath'letes (Greek, *athlētai*), combatants who took part in the public games of Greece; also young men who went through the gymnastic exercises to harden themselves and to become fit to bear arms. In a narrower sense athletes were those who made the athletic or gymnastic exercises their principal business, particularly wrestlers and boxers. Their business was to contend at the public festivals, and they regulated their habits of life for this end. Not only the applause of the people, but also crowns and statues, were conferred upon the victor. He was led in triumph; his name was written in the public records; and poets sang his praise. He also received peculiar privileges, had a yearly pension, and the foremost seat at the sacred games.

Athlet'ics, or **Athletism**, is the exhibition of man's physical prowess in games of skill and endurance, and though in the passing centuries it has undergone many phases, it is practically the same to-day as when the Olympian games, which were resumed at the Pan-American Exhibition at Buffalo in 1901, were originally given 2,500 years ago, and Greece met in her prime. Then not only Greek met Greek, but the influence of the Olympian, Pythean, Nemean and Isthmian games was felt to the farthest extremities of Asia. After the fall of Rome, the mantle of physical prowess which that nation had inherited from the Greeks, fell upon the shoulders of the sturdy Norseman, whose chief glory was in his individual capacity to bear unflinchingly the stress and strain of contests and the elements. They bred into the bone, the hardihood, and love of personal achievement which in turn carried the current through the Dark Ages, even into those of the exaggerated chivalry, which Cervantes killed with ridicule

in 'Don Quixote.' The spirit of the Greek, Roman, and Norseman planted its seeds in the hardy Anglo-Saxons, who in turn transplanted them into Virginian and New England soils on the northern continent of America, where its influence has been felt, even to the entire disappearance of the softer Latin races' supremacy. It is not surprising, therefore, that, with the disappearance of the earlier modes of life of the first settlers, calling for all the physical strain that the human frame was capable of, and the return of the comparative leisure which in early youth now surrounds the American universities and colleges, there has re-appeared a yearning after opportunities to supply, artificially, if so it must be, the stress and contest, physical effort, and the proof of supremacy of the earlier ages, when such conditions were compulsory. It was in the blood, and it came out, much to the nation's benefit. First in the form of isolated college and club contests, and subsequently in such a volume as to need a separation of contests into classes and the creation of an especial federation of the separate units, to regulate and control it. In the beginning, athletics developed in this or that college, or university, or club, acting separately and indiscriminately in its scope. Ultimately the lines of natural cleavage forced athletics into its two great branches: one outdoors, commonly known as track-events; the other, those carried on in a gymnasium. The out-door events are those which are now usually meant when the term athletics is used. The development of these came tentatively. First one college, or university, or club, then another, organized outdoor contests, until at length the net was spread over all the rising generation, and the Amateur Athletic Union was formed, whose fundamental rule is that "no person shall be eligible to compete in any athletic meeting, game or entertainment given or sanctioned by this Union who has (1) received or competed for compensation or reward, in any form, for the display, exercise or example of his skill in or knowledge of any athletic exercise, or for rendering personal service of any kind to any athletic organization, or for becoming or continuing a member of any athletic organization; or (2) has entered any competition under a name other than his own, or from a club of which he was not at that time a member in good standing; or (3) has knowingly entered any competition open to any professional or professionals, or has knowingly competed with any professional for any prize or token; or (4) has issued or allowed to be issued in his behalf any challenge to compete against any professional, or for money; or (5) has pawned, bartered or sold any prize won in athletic competition; or (6) is not a registered athlete. Nor shall any person residing within the territory of any active member of this Union be eligible to compete for or to enter any competition as a member of any club in the territory of any other active member of this Union, unless he shall have been elected to membership in such club prior to 1 April 1891; provided, however, that this restriction as to residence shall not apply to undergraduates connected with any allied college athletic organization.

"No one shall be eligible to compete in any athletic meeting, games or entertainment given or sanctioned by this Union, unless he shall be

ATHLONE; ATHOL

a duly registered athlete, a member of the organization from which he enters, and shall not have competed from any club in this Union during a period of three months next preceding such entry; nor shall any member of any club in this Union, or any club in any district in this Union be allowed to compete in case he has withdrawn in one year competed as a member of any other club then in this Union, except with the consent of such other club, which consent shall be filed with the registration committee of his district prior to such competition unless such other club shall have disbanded or practically ceased to exist; provided that the requirements of this section shall not apply to any athletic meeting, games, or entertainment, the entries for which are confined to the club or organization giving such meeting or entertainment.

"No athlete who has been released from a club which is a member of this Union, and who competes for another club directly thereafter, shall be allowed to compete again for the club he was released from for one year from the date of his release, except that the club has disbanded or ceased to exist.

"No person shall be eligible to compete for or enter any competition as a member of any club in the territory of any active member of this Union, unless he shall have resided within the territory of said active member at least four months previous to entering for competition; nor shall any person be eligible to enter or compete in any district championship meeting unless he shall have been a bona-fide resident of such district for at least six months prior to the holding of such championship meeting; and no person shall be eligible to compete in a championship meeting of more than one district in one year. The restrictions contained in this section shall not affect the eligibility of an undergraduate connected with any allied college athletic organization who shall have been elected to membership in any club of this Union prior to 20 Nov. 1899, to represent such club as long as he remains an undergraduate; nor shall these restrictions apply to an undergraduate competing for any college belonging to an allied body."

The Amateur Athletic Union (A.A.U.) of the United States has jurisdiction over the following out-door sports among amateurs: Baseball, bicycling, boating, bowling, cross-country running, football, hurdle-racing, jumping, lacrosse, lawn-tennis, pole-vaulting, putting the weight, quoits, racquets, running, skating, sculling, swimming, throwing the hammer, throwing weights, tug of war, and walking. The Union consists of the *Metropolitan Assoc.*, comprising the States of New York and New Jersey, north of Trenton; the *New England Assoc.*, comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; the *Atlantic Assoc.*, comprising New Jersey, south of and including Trenton, Delaware, Maryland, Pennsylvania, West Virginia, District of Columbia, Virginia, North Carolina, South Carolina, Florida, and Georgia; the *Central Assoc.*, comprising Ohio, Illinois, Indiana, Michigan, Wisconsin, Iowa, Minnesota; the *Pacific Assoc.*, comprising California, Arizona, Nevada, Utah, Idaho, Oregon, and Washington; the *Southern Assoc.*, comprising Alabama, Louisiana, Florida, Mississippi, Texas, Georgia, and Tennessee; the

Western Assoc., comprising Missouri, Wyoming, Arkansas, Oklahoma, South Dakota, North Dakota, Indian Territory, Kansas, Kentucky, New Mexico, and Colorado; and the *Pacific Northwest Assoc.*, comprising Idaho, Montana, Oregon, Washington, and Alaska. All its meetings are under the direction of "a games committee," one referee, two or more inspectors, three judges at finish, three or more timekeepers, a starter, a clerk of the course, a scorer, and a marshal; besides which all the conditions and restrictions for various events: the number of throws allowed, the size of the area of preliminary effort, as in shot-putting, etc., are subject to definitions from time to time promulgated, and imposed, by virtue of the authority of the A. A. U. in meeting assembled.

The athletic events at outdoor field meetings are for 100, 220, 440, and 880 yards run; 1 and 5 mile run; 1 and 3 mile walk; 2 mile bicycle ride; pole vault for height; running high and broad jumps; throwing 16-pound hammer; throwing 56-pound weight, for distance; putting 16-pound shot; 120 yards hurdle-race, 10 flights 3 feet 6 inches high; 220 yards hurdle-race, 10 flights 2 feet 6 inches high; and at indoor meetings, for runs of 75, 150, 300, 600, and 1,000 yards; 2 mile run; three quarter mile and 4 mile walk; standing, broad, and high jumps; three standing broad jumps; running hop, step, and jump; pole vault for distance; throwing 56-pound weight for height; putting 24-pound shot; 200 yards hurdle-race, 10 flights 3 feet 6 inches high; 300 yards hurdle-race, 10 flights 2 feet 6 inches high; and tug of war, 4 men, unlimited weight. The associations award in each year three prizes for all-round excellence to the three athletes making the highest three aggregate scores, and two prizes for individual excellence. The Intercollegiate Association of Amateur Athletes of America is the governing body of inter-college athletics. Its championships must be won at the annual meeting. See also GYMNASICS.

Bibliography.—Stonehange, 'Rural Sports,' illustrated; Cassell, 'Sports and Pastimes,' with 700 illustrations; 'Athletics' (by various authors) in the 'Encyclopedia of Sport'; James Sullivan, 'Athletic Almanacks' (issued yearly).

Athlone, áth-lôn', a town of Ireland, on the Shannon, about 67 miles west by north of Dublin. It is divided by the river into two nearly equal parts, which communicate by a handsome stone bridge of five arches. It is one of the chief depôts for troops and military stores; and the barracks, occupying a height above the river, can accommodate 1,500 men, and have attached an ordnance yard, magazines, and armory provided with 15,000 stand of arms. By means of a canal the Shannon has been rendered navigable for 71 miles above the town, which, being also terminus of four important railways, carries on a brisk trade. The chief industrial establishment is an extensive woolen factory, and there are also large saw-mills. Pop. (1891) 6,742.

Ath'ol, Mass., a town in Worcester County, on Miller's River, and the Boston & A., and Fitchburg R.R.'s; 26 miles northwest of Worcester. It contains several villages, has electric railways connecting with the suburbs, and is principally engaged in the manufacture of cotton warps, shoes, sewing-silk, fine mechanical tools, matches, organ-cases, pocket-

ATLANTA UNIVERSITY — ATLANTIC OCEAN

The Georgia Institute of Technology, with 481 students, is the most important institution for higher education. It has textile, mechanical engineering, and electrical engineering schools, and machine-shop practice, in addition to literary and scientific courses. The total number of students in these institutions for white youth is 2,500. A site has been given and funds are partially raised for a Presbyterian university, the total investment of which will be \$1,000,000.

There are six institutions for the higher education of colored youth, with a total attendance of 2,265. They include literary and scientific schools, theology, industrial training, and a training school for nurses. Charities are numerous and include such educational features as free kindergartens, night schools, and three orphan asylums. Grady Hospital is supported by the city; St. Joseph's Infirmary by the Roman Catholics, and the Presbyterian Hospital by the Presbyterians. Private hospitals or sanatoriums are numerous and well equipped. There are two theatres with 2,500 and 2,000 seating capacity, and two lyceum or lecture associations. Carnegie Library is a white marble building in classic style, and contains 20,000 volumes. The book circulation is 11,000, one fourth among juveniles. There are 131 churches, including missions, and the attendance in fair weather averages 25 per cent of the population. The total membership exceeds a third of the population. Railway facilities include 10 radiating lines, five of which belong to the Southern Ry., and three controlled by the Louisville & N. system. A union depot to cost \$900,000 is under construction. Belt lines complete the terminal system. Local transportation is unified in a system of well-equipped street railways, covering 142 miles of track, 100 miles within the city, the rest extending eight miles out. The area of the city is 11 square miles, and the boundary a circle of $3\frac{1}{2}$ miles diameter, extended in two suburbs. Street improvements since 1880 cost \$3,807,667, including 100 miles of sewers, 63 of paved streets, 227 of sidewalks. Six miles of streets are paved with asphalt, the remainder with granite blocks, macadam, and vitrified brick. The city waterworks takes its supply from the Chattahoochee River above Peachtree Creek, in a sparsely populated district. By settling and filtration water is purified. Two engines of 15,000,000 gallons daily capacity each pump it into the city. The consumption in 1902 was 8,966,000 gallons a day. For domestic use water is supplied at 10 cents per thousand gallons. At this rate, with some reduction to manufacturers, the city makes a profit. Fire, police, sanitary, and other city departments are well equipped and efficient. The city government is administered by a mayor and general council. Appropriation bills are voted separately by two legislative branches, and the mayor has a veto. Bonded debt is limited by State Constitution to 7 per cent of the taxable wealth. The charter requires a sinking fund to retire all bonds in 30 years from date of issue. Atlanta is one of ten cities designated by the secretary of the treasury whose bonds might be used as security for federal deposits. The tax rate is $1\frac{1}{4}$ per cent and the assessment averages 60 per cent of actual value.

The cool and invigorating climate makes Atlanta a desirable place of residence, the mean summer temperature being 77; winter 44. Streets are made attractive by grassy lawns and shade

trees. Grant Park, Piedmont Park, Lakewood, East Lake, Ponce De Leon Spring, and the Chattahoochee River are outing resorts. A bill has been introduced in Congress to make a national military park on the battle ground north of the city. Public spirit is strong in Atlanta. The Chamber of Commerce, Clearing House Association, Credit Men's Association, Manufacturers' Association, and Freight Bureau are organs for concerted action among business men. The Greater Georgia Association, projected by the Atlanta Chamber of Commerce, unites the efforts of Georgia towns, cities, and counties to develop the resources of the State. Fraternal and social organizations are numerous and active. Religious denominations are well organized.

W. G. COOPER.

Atlan'ta University, a co-educational (non-sectarian) institution, in Atlanta, Ga., organized in 1869. In 1899 it had 20 professors, 300 students, 10,500 volumes in the library, grounds and buildings valued at \$250,000, and an income of \$35,000.

Atlantes, ät'-län'tēz, in architecture, colossal statues of men used instead of pillars to support an entablature. Roman architects called them *telamones* (Greek)

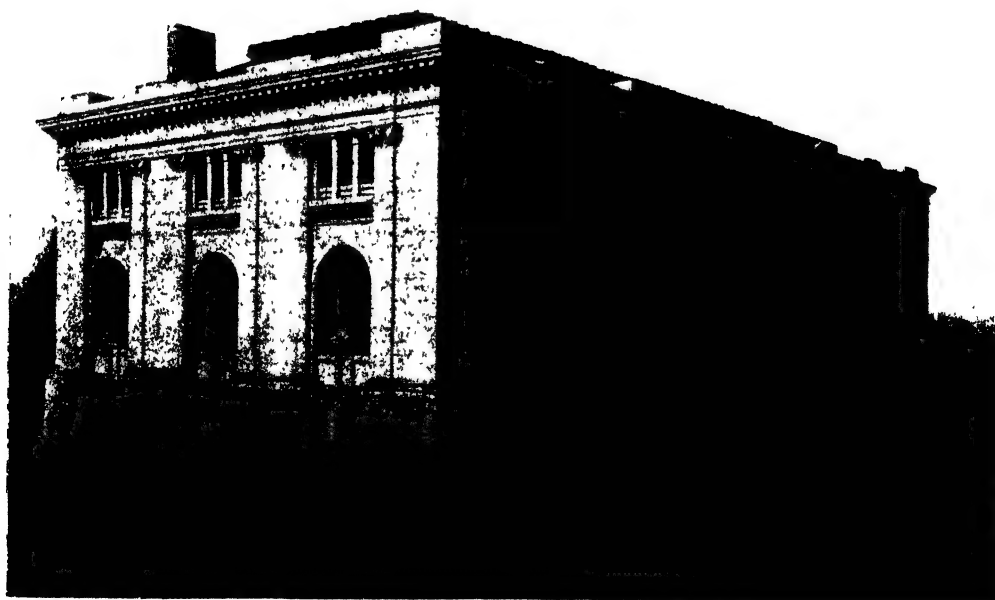
Atlan'tic, Iowa, a city and county-seat of Cass County, situated on the Chicago, R. I. & P. R.R., 80 miles southwest of Des Moines. It has various manufacturing interests, including iron and bridge works, planing mills, canning factories, starch-works, soap-factory, and two machine shops. It was chartered as a city in 1869. Pop. (1900) 5,046

Atlan'tic City, N. J., a city and seaside resort in Atlantic County; on the Atlantic Ocean and on the Reading and the Pennsylvania R.R.'s. It is built on a long, sandy island, known as Absecom Beach, 60 miles southeast of Philadelphia. The island stretches along the coast for 10 miles; has an average width of three fourths of a mile, and is from four to five miles from the mainland. At the north end is the Absecom Light, well known to coastwise sailors. The city has several miles of bathing beach, a magnificent promenade on the ocean front, nearly 100 hotels and boarding houses, electric lights, public schools, churches of the principal denominations, seven national banks, and daily, weekly, and monthly periodicals. It is probably the most important all-the-year-round resort in the United States, its splendid climate giving it a large popular patronage even in the dead of winter. The assessed property valuation exceeds \$14,000,000. A fire in April 1902 destroyed many hotels and other buildings and led to a municipal enactment that all structures henceforth erected within the municipal limits must be fireproof. Atlantic City was first settled in 1854. It is governed by a mayor and a city council of 17 elected by popular vote. Pop. (1890) 13,055; (1900) 33,000; (in summer) 150,000.

Atlan'tic Ocean, the vast expanse of water lying between the western coasts of Europe and Africa, and the eastern coasts of North and South America, and extending from the Arctic to the Antarctic Seas. Its greatest breadth is between the western coast of North Africa and the eastern coast of Florida in North America,



GEORGIA SCHOOL OF TECHNOLOGY.



CARNEGIE LIBRARY.

ATLANTIC OCEAN

a distance of 4,150 miles. If the Gulf of Mexico, in reality one of its bays, be included, it will extend to 5,000 miles. Its least breadth, between Norway and Greenland, is about 930 miles. Between Cape St. Roque, Brazil, and Sierra Leone, the breadth is 1,730 miles. Its superficial extent has been estimated at 25,000,000 square miles. From the number and extent of its inlets, gulfs, and bays, its coast lines are of great length, the eastern being upward of 32,000 miles, and the western upward of 55,000. Its principal inlets and bays are Baffin and Hudson bays, the Gulfs of Mexico, Honduras, and San Juan, the North Sea or German Ocean, the Bay of Biscay, and the Gulf of Guinea. The principal islands north of the equator are Iceland, the Faroe, and British islands, the Azores, Canaries, and Cape de Verd islands, Newfoundland, Cape Breton, and the West India islands; and south of the equator, Ascension, St. Helena, Trinidad, Columbus, and Tristan da Cunha, the last three being mere rocks.

Currents — The great currents of the Atlantic are of two kinds, drift and stream. Drift currents are produced by the wind, either by the perpetual or trade winds, or by prevailing winds. Those having the former origin are constant, running always in the same direction, and generally with a nearly equal velocity; those having the latter are not so constant, neither do they always run in the same direction, nor at a similar rate. The drift currents produced by the trade winds are found between the tropics; those resulting from prevailing winds, north and south of the parallels of 30°. Stream currents are due indirectly to the influence of winds, being produced by drift currents, of which they are continuations. As these currents travel for great distances they meet with many obstacles in their course, which result in changes of direction. A stream current may thus be successively propelled by different currents, or consist in the combination of different stream currents. A third kind of currents is produced by the flow of the water to restore the level disturbed by other currents. This is called a current of indraught. The great currents of the Atlantic are the Gulf Stream, the equatorial current—which may be divided into the main equatorial current, the north equatorial current, and the south equatorial currents—the North African and Guinea current, the South connecting current, the Southern Atlantic current, Cape Horn current, Rennel current, and the Arctic current.

The Gulf Stream is a continuation of the main equatorial current, and partly of the north equatorial current, both western drift currents produced by the trade winds. The former passes across the Atlantic to the American coast, upon which it strikes from Cape St. Roque to the Antilles. On being turned by the coast it runs along it at a rate of 30 to 50 miles per day, and sometimes at a higher speed, till it enters the Gulf of Mexico, from which, having previously received part of the waters of the north equatorial current, it issues between Florida and Cuba under the name of the Gulf Stream. It afterward flows nearly parallel to the coast of the United States, separated from it by a belt of cold water. Off Cape Hatteras it spreads into an expanding channel, reaching a breadth of 167 miles, and consisting of three warm sections with two cold belts interposed.

On passing Sandy Hook it turns east and continues to be recognizable, partly by the blue color derived from the silt of the Mississippi, till about lon. 30° W., where, with a greatly diminished temperature, it is found flowing nearly due east. The equatorial current, so called from its being under the line, commences on the western coast of Africa, about lat. 10° S., or nearly opposite St. Paul de Loando. From this point it pursues a northwest direction till it makes lon. 0°, when it proceeds due west on both sides of the equator, till it arrives at Cape St. Roque in South America, when it is divided into two branches, one running along the Guiana coast, and into the Gulf of Mexico, as already mentioned, the other along the coast of Brazil, and so called the Brazil current. The latter is reinforced by the south equatorial current, which, however, is not distinctly separable from the main equatorial current. The length of the equatorial current, from the coast of Africa to Cape St. Roque, is 2,500 miles. Its breadth near the commencement is 185 miles; opposite Cape Palmas, 420; and before dividing, about lon. 31° or 32° W., it is 510. Its average velocity, which is greater in summer than in winter, is from 25 to 30 miles a day. The North African and Guinea current originates between the Azores and Cape Finisterre in Spain. It flows in a southeasterly direction, and after sending a mass of water into the Mediterranean it pursues a southerly course to Cape Mesurada, south of Sierra Leone, keeping at a considerable distance from the land. It then flows rapidly for 1,000 miles due east to the Bight of Biafra, where it seems to mingle with the equatorial current. It is led from the west by the Guinea counter current, a back flow of water between the main and the north equatorial currents. The south connecting current strikes across the South Atlantic from the Brazil current, then turns north, and finally joins the great equatorial current. The South Atlantic or South African current originates north of the Cape of Good Hope, from which it flows in a northwesterly direction, at a rate of from 15 to 30 miles a day, and eventually merges into the equatorial current. Cape Horn current flows constantly from the Antarctic and South Seas into the Atlantic Ocean, its general direction being east-northeast and northeast. Rennel current, which is possibly a continuation of the Gulf Stream, enters the Bay of Biscay from the west, curves round its coast, and then turns northwest toward Cape Clear in Ireland. The Greenland or Arctic current runs along the east coast of Greenland to Cape Farewell; having doubled this cape, it flows up toward Davis Strait, from which it receives an inflow of water, and then turns to the south along the coast of Labrador, and continues along the coast of the United States, from which it separates the Gulf Stream by a cold band of water. Immense masses of ice are borne south by this current from the Polar seas, and carried into warmer regions, where they gradually dissolve and disappear. In the interior of the North Atlantic there is a large area comparatively free from currents, lying between 20° and 30° N. and 30° to 60° W. It is called the Sargasso Sea, from the large quantity of sea weed which drifts into it. A similar area exists in the South Atlantic, to which the same name is occasionally applied by

ATLANTIC TELEGRAPH—ATLAS

analogy, though it is destitute of sea weed. It extends between 20° and 30° S. and 0° and 25° W. Besides the surface currents, recent investigation has established the existence of a general oceanic circulation, consisting of an under current of cold water flowing from the Poles to the equator, and an upper current of warm water from the equator to the Poles.

The winds of the Atlantic are not peculiar to that ocean, but identical with those that prevail in the same latitudes in the other seas around the globe. The most remarkable of these are the perennial or trade winds, which blow constantly in one direction, namely, from east to west, or nearly so. The tract of the trade winds to the north of a zone, which is almost always found on the north side of the equator, is called the region of the northeast trade wind, from blowing one or two points north of east; that to the south, the region of the southeast trade wind, from blowing south of east. The northeast trade wind blows with less steadiness than the southeast, but toward the West India islands it keeps generally steady between east and northeast. The trade winds are constant only at a considerable distance from land, and become more steady the greater the expanse of water over which they blow.

Depths.—The greatest depth yet discovered in the Atlantic is to the north of the island of Porto Rico, in the West Indies, namely, 27,366 feet. Formerly depths of 40,000 or 50,000 feet were reported, but this was owing to defective sounding apparatus. The geography of the ocean bed is now pretty well known, especially in the North Atlantic. Cross-sections of the North Atlantic between Europe and America show that its bed may be represented as exhibiting two great valleys lying in a northerly and southerly direction, and separated by an intervening ridge. Each of these valleys is about 500 miles in width. The mean depth of the east valley is about 14,000 or 15,000 feet, and it can be traced from the equator to the latitude of the Faroes, where it terminates, or over an extent of 3,700 miles. The west valley has a maximum depth of 16,800 feet, and can be traced from the latitude of the Azores as far north as Greenland, where it bifurcates, the deeper portion pointing north up Baffin Bay. The submarine ridge dividing these two valleys appears to be very uniform in depth below the surface, having 1,600 fathoms of water above it from the Azores to the latitude of the Hebrides. It then rises gradually till at last it culminates in Iceland. On this plateau the Atlantic telegraph cables have been laid, and from it the first specimens of deep-sea mud were brought up. This was found on examination by the microscope to consist of a large extent of calcareous shells (*Foraminifera*), not water-worn, but quite perfect, showing that the water at such depths can have little or no motion. No sandy particles were found in the mud. The South Atlantic is not so well known as the North, but so far as soundings yet prove it has not a greater depth than the latter, the greatest depth found being 2,900 fathoms, in lat. 28° S. It would appear to be separated from the North Atlantic by a rocky ridge, on which rest the islands of Ascension, Fernando de Noronha, and St. Paul. The saltness and specific gravity of the Atlantic

differ in various parts, and gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. In the neighborhood of the British Isles the salt is given as one thirty eighth of the weight of the water. See OCEAN CURRENT.

Atlan'tic Telegraph. See TELEGRAPH.

Atlan'tides, a name given to the Pleiades, the seven daughters of Atlas or of his brother Hesperus.

Atlan'tis, or **Atlan'tica**, a large island traditionally asserted to have once existed in the ocean immediately beyond the Strait of Gades; that is, in what is now called the Atlantic Ocean, a short distance west of the Strait of Gibraltar. Homer, Horace, and some others made two Atlanticas, distinguished as the Hesperides and the Elysian Fields, and believed to be the abodes of the blessed. Plato states that an easy passage existed from the one Atlantis into other islands, which lay near a continent exceeding in size all Europe and Asia. Some have thought this America. Atlantis is represented as having ultimately sunk beneath the waves, leaving only isolated rocks and shoals in its place. Geologists have discovered that the coast line of western Europe did once run farther in the direction of America than now; but its submergence seems to have taken place long before historic times. 'The New Atlantis' is the title which Lord Bacon gives to a literary fragment, in which he sketched out an ideal commonwealth.

Atlan'tis, a romance of the antediluvian world, by Ignatius Donnelly (1882).

Atlan'tosau'rus. See CAMARASAURUS.

Atlas, an extensive mountain system in North Africa, starting near Cape Nun, on the Atlantic Ocean, traversing Morocco, Algiers, and Tunis, and terminating on the coast of the Mediterranean. It is divided into the great and little Atlas. The little Atlas is the range nearest the sea-coast; the great is more inland, and borders on the desert. In fact, however, the two ranges are one and the same system, though sometimes connected only by separate mountains, or ranges of low hills. On the coast, the range skirts the Mediterranean, from Cape Spatel, and the straits of Gibraltar, to Cape Bon, on the northeast of Tunis. The Atlantic shore is sometimes sandy and low, at other times formed by cliffs, which do not attain any great height, except at Cape Ghir. The Mediterranean shore, between Capes Spatel and Bon, is generally rugged, and in places attains a considerable height. Between Cape Bon and the gulf of Gabes it is rocky, but without reaching any great elevation. The southern slope of the Atlas reaches the great desert, from which it is separated by a region of sand hills, shifting with every strong wind, and gradually making encroachments on the fertile lands at the foot of the mountains. On the west of the gulf of Gabes, Mount Nofusa, the last eastern spur of the Atlas, joins Mount Garian, which extends into the regency of Tripoli. The French geographers include within the limits of the Atlas their own province of Algeria, together with the empire of Morocco, and a part of Tunis. The whole area is 500,000 square miles, including a great variety of surface, mountains, valleys, and extensive plains.



ATLAS — ATMOSPHERE

The loftiest peaks form a diagonal line, striking across the general course of the mountains from southwest to northeast. This line begins at Cape Ghir, on the Atlantic, which rises almost perpendicularly from the sea to a great elevation. It then stretches away, east of the meridian of Morocco, then turns abruptly northeast, and from this quarter four important rivers take their rise, the Wady Oum Erbegh (Morbeya), the Mulua, the Tafilet, and the Draa. At this precise spot, the loftiest peaks of the whole mass seem to be brought together, and the most elevated chain runs away north. The principal chain traverses a region called the desert of Ansad, the boundary line between Morocco and Algiers. Here the name great Atlas is first applied. The principal chain recurs in Algeria, where its highest part is called Wanashrees, or Warensenis, and terminates on the banks of the Shelliff, whose valley makes a gap in its course. It reappears southwest of Algiers, in the lofty summits of the Jurjura. From this point, the chain follows a direction parallel to the coast, then it dips again to the southeast, and takes the name of the mountains of Wannooga. Further on to the east, we meet it as the Djebel Aures, and approaching the coast again, it penetrates into the territory of Tunis, under the name of Mount Tipara, terminating at Cape Blanco and Cape Zibeb, on the north of the city of Tunis. The highest summits, the Miltzin (11,400 feet), southeast of the city of Morocco, and other mountains near the Wady Oum Erbegh, and the Mulua, are rarely free from snow. The greatest heights of the entire system are the Jebel Ayashi (14,600 feet), and Tamjurt (14,500 feet). The little Atlas is by no means so lofty, its highest peak, Shelia, having an altitude of only 7,611 feet. The great Atlas is the water-shed of the province. The rivers flowing north from this line force their way through the lesser Atlas to the Mediterranean, while those that take their rise on the southern slope are lost in the marshes of the desert. There are several defiles through the Atlas, the best known of which are those of the Beboonan, leading to Terodant in Morocco, and the Biban, or Iron gate on the east, leading from Algiers to Constantine. The geological constitution of these mountains presents old limestone alternating with a schist, oftentimes passing to a well-characterized micaceous schist, or gneiss. The stratification of the gneiss is also very irregular, only presenting organic débris; then come schistose clays, alternating with secondary limestones; then come limestone with white clays, and iron sands resting on blue clay. This formation is particularly developed near Oran, and the plains in which the soil is formed from it are of great fertility. Volcanic rocks have been found in small quantities. There are veins of iron, copper, and lead. Saltpetre is found near Terodant. About 50 miles from the same town, excellent malleable iron is found. At Elala there are copper and silver mines. The vegetation embraces all the varieties of both temperate and tropical climates. The Atlas was known to the ancients, and the Romans formed several colonies in the district.

At'las, an anatomical term applied to the first vertebra of the neck, which supports the head. It is connected with the occipital bone in such a way as to permit of the nodding

movement of the head, and rests on the second vertebra or *axis*, their union allowing the head to turn from side to side.

At'las, in Greek mythology, the Titan whom Zeus condemned to bear the vault of heaven. The same name is given to a collection of maps and charts, and was first used by Gerard Mercator in the 16th century, the figure of Atlas bearing the globe being represented on the title-pages of such works.

At'lee, Washington Lemuel, American surgeon · b. Lancaster, Pa., 22 Feb. 1808; d. 6 Sept. 1878. He became noted as a pioneer in ovariectomy and the removal of uterine fibroid tumors, and published 'Ovarian Tumors' (1873) 'Struggles and Triumphs of Ovariectomy' (1875), and a prize essay on 'Fibroid Tumors of the Uterus' (1876).

At'midom'eter, an instrument for measuring the evaporation from water, ice, snow, etc. It consists of two glass or metal bulbs, one of them placed above the other, with which it communicates by a narrow neck. The instrument having been immersed in a vessel of water through a circular hole in which the steam rises, distilled water is gradually poured into the pan above, causing it to sink to the point at which the zero of the stem is on a level with the cover of the vessel. As then the water in the pan gradually evaporates, the steam slowly ascends, the amount of evaporation being indicated in grains on the graduated scale.

Atmol'ysis, the separation of the components of a gaseous mixture by means of diffusion. See **DIFFUSION**.

Atom'eter, an instrument invented by Sir John Leslie for measuring the quantity of moisture exhaled in the open air in a given time from any humid surface. It consists of a very thin ball of porous earthenware, from one to three inches in diameter, having a small neck firmly cemented to a long and rather wide tube of glass, to which is adapted a brass cap with a narrow collar of leather to fit closely. It is filled with distilled or pure water, and its cap screwed tightly. It is then suspended out of doors where it is exposed freely to the action of the wind, but sheltered from rain. As the water evaporates from the external surface of the ball, it transudes through its porous substance, and the waste is measured by the corresponding descent of the liquid in the stem. To test the amount of this descent, there is a finely-graduated scale. When the water has sunk to the bottom of the stem, the latter requires to be filled anew.

At'mosphere (Greek, "vaporous sphere"), in ordinary usage, the gaseous envelope that surrounds the earth. The atmosphere consists chiefly of the gases oxygen and nitrogen, not chemically combined, but mechanically mixed in the proportion of about 21 volumes of oxygen to 79 of nitrogen. It also contains small quantities of carbon dioxid, organic matter, water vapor, argon, and other substances. (For a more precise statement of its composition, see **AIR**.) At the surface of the earth it has a density of about 1/800th of that of water, though this varies somewhat with the height above the sea level at which the determination is made, and with the temperature and barometric pressure prevailing at the time. The presence of

ATMOSPHERE

free nitrogen in the atmosphere may be attributed, probably, to the comparative inertness of that gas, so far as any tendency to form chemical compounds is concerned. The presence of free oxygen cannot be explained in this manner, however, because oxygen is one of the most active chemical substances known. It appears more probable that oxygen is present in the free state simply on account of the immense quantity of that element that the earth contains. In past geological times, it combined with practically all of the oxidizable minerals that were near enough to the surface of the earth to be accessible to it, and the present supply of free oxygen in the atmosphere must be regarded as merely the excess of that element that remained unused, after all the possible oxidations had been effected. According to this view, the earth (at least in its more superficial parts) is a gigantic, burned-out cinder; and this accords with the estimates that chemists and geologists make, that nearly one half of the weight of the earth's crust consists of oxygen. It is likely that in past ages, and particularly in the carboniferous period when the vegetation that gave rise to our modern coal fields was flourishing, the quantity of carbon dioxide present in the atmosphere was considerably greater than at the present time. Part of this gas was absorbed by plants, its carbon being stored in the coal beds and its oxygen returned to the air; but it is likely that by far the greater portion combined with lime and other similar earths to produce the present vast deposits of limestone and other carbonated minerals and rocks. At the present day, carbon dioxide is being absorbed from the atmosphere by plants, and returned to it again by animals, and by factories in which coal is burned. We have no means of knowing whether the balance is being preserved, so far as this constituent of the atmosphere is concerned, or not; because the mass of the entire atmosphere is too vast for the composition to be sensibly changed by these causes, since the time when exact analyses became possible.

Galileo observed that water cannot be drawn up by a suction pump or other equivalent device, to a greater distance than about 34 feet. He did not succeed in explaining the existence of this limiting height, but his friend and amanuensis Torricelli, who succeeded him as professor at Florence, afterward made the shrewd guess that water rises in such a pump for the reason that the atmosphere exerts a certain pressure upon all terrestrial objects, and that when a portion of this pressure is removed from the water in the suction tube of the pump, it is the pressure of the atmosphere upon the water external to the pump that causes the water in the pump-tube to rise; and he saw that if that were the case, it would follow that a pump could only "draw" water up to the particular height at which the pressure due to the water-column so "drawn up" would precisely balance that of the atmosphere. The limit of 34 feet corresponds (as is easily shown by a simple calculation) to a pressure of about 15 pounds to the square inch; and hence Torricelli inferred that the atmosphere exerts a pressure of that amount upon all objects. Meditating upon this hypothesis, it occurred to him that if his explanation were indeed correct, the atmosphere would be able to raise mercury (which is about 14

times as heavy as water) to only about one fourteenth of the height to which it can raise water. He accordingly (in 1643) procured a glass tube some 35 inches long, and closed at one end. Placing it with the open end upward, he filled it with mercury. He then covered the open end to prevent the escape of the mercury, and inverted the tube so that its mouth dipped into a basin also filled with mercury. Upon uncovering the open end of the tube, he was gratified to see that the mercury in the tube at once sank until its upper surface stood at about 30 inches above that in the basin. This experiment proved that the atmosphere exerts a pressure equal to that due to a column of mercury 30 inches high, or, in other words, equal to about 14.7 pounds per square inch. Additional proofs were soon given, also. Thus Pascal suggested that if the explanation were true, the pressure ought to be less at the top of a mountain, than in a lower place; because the mountain projects up into the atmosphere so far that there is a sensibly smaller height of air above it than there is above a point in a valley. The experiment was actually carried out by M. Perrier, who carried an apparatus like Torricelli's (now known as a "barometer") to the summit of a mountain in Auvergne called the Puy de Dôme, and found at the top of this mountain (which is 4,800 feet high) the atmosphere could sustain only about 27 inches of mercury, although after returning to the plains below, the full height of 30 inches was again observed. Shortly afterward (in 1650) the air-pump was invented by Guericke, and the pressure of the atmosphere was demonstrated beyond any doubt whatever, by numerous direct experiments.

The pressure of the atmosphere varies somewhat from day to day, and even from hour to hour, as well as with the latitude and with the height above the sea. For scientific purposes the normal atmospheric pressure is now generally taken to be equal to the pressure due to a column of pure mercury 760 millimeters (29.9212 inches) high, at the level of the sea, in latitude 45°; the mercury being at the temperature 32° F. The pressure so defined is called an "atmosphere"; or, more briefly and conveniently, an "atmo." The "atmosphere" of pressure, as so defined, is nearly equal to a pressure of one million dynes per square centimeter, and it has therefore been proposed to take one million dynes per square centimeter as the standard atmosphere of pressure, calling it an "absolute atmosphere," because the dyne is a unit in the "absolute system" of units. This proposal has not yet been adopted by physicists to any great extent. See UNITS.

Knowing the pressure exerted by the atmosphere upon each square inch of the earth's surface to be about 14.7 pounds, and knowing the dimensions of the earth, it is not difficult to calculate the total weight of the entire atmosphere. The calculation, when performed, shows that the mass of the atmosphere is about 1/1,000,000th of that of the whole earth.

If the atmosphere were of uniform density, it would be easy to calculate the height to which it extends. We should only have to divide the pressure upon one square inch of the earth's surface by the weight of a cubic inch of the air, and the quotient would be the height of the

ATMOSPHERIC ENGINE—ATMOSPHERIC RAILWAY

atmosphere, in inches. Thus a cubic inch of air, at a pressure of 30 inches of mercury and at the temperature of freezing water weighs about 0.000749 of an ounce; and as a column of mercury 30 inches high exerts a static pressure of about 235.8 ounces, it follows that if the atmosphere were homogeneous (that is, of uniform density throughout), its height would be about $235.8 \div 0.000749 = 314,000$ inches, or 4.97 miles, when the air has a temperature of 32° F., and the barometric pressure is 30 inches. The height so calculated is convenient for use in certain physical computations, and is called the "height of the homogeneous atmosphere." If we turn from this problem to the more difficult one of determining the *actual* height of the atmosphere, we find that no satisfactory results can be given. As we go up, the strata become rarer and rarer, for the reason that the lower layers are weighed down and compressed by those above, and at increasing heights there is less and less air above, to exert this compression. At great heights the atmosphere becomes more and more attenuated, and thins out by insensible gradations into a perfect vacuum. There is no definite boundary, immediately below which there is an atmosphere, and immediately above which there is none. Glaisher and Coxwell, in their famous balloon ascension of 5 Sept. 1862, attained an actual elevation of over 29,000 feet, and observed a barometric height of 95 inches (corrected); but it is certain that the atmosphere extends far higher than this. Some estimates, based on the calculated heights of shooting stars when they first become luminous, place the limit at which the atmosphere has a density sufficient to produce any observable effects, at about 200 miles; but, as has been pointed out above, all estimates of this kind are necessarily indefinite and unsatisfying. (For some of the questions raised in connection with the limits of the atmosphere, see GASES, KINETIC THEORY OF.)

The atmosphere, as might be expected from its relatively great depth, exhibits an absorption spectrum (see SPECTROSCOPE), and this varies to a certain extent from time to time. A portion of this absorption spectrum is due to the presence of water vapor, and the "rain bands" in the spectrum have been utilized to a limited extent (though not very generally) in connection with weather predictions. It is also known that the atmosphere is less transparent to the rays at the blue end of the spectrum than to those in the middle and toward the red end. The experiments of Professor S. P. Langley, on the expedition of the United States Signal Service to Mount Whitney, demonstrated that this selective absorption is so great that the sun would appear distinctly bluish, instead of white or yellowish as it does under actual conditions, if we could see it from a point outside of our own atmosphere. (See Langley, 'Researches on Solar Heat,' 1884.)

Little is yet known concerning the electrical phenomena of the atmosphere. In clear, calm weather, the atmosphere appears to be always positively electrified, with respect to the earth, and the difference in potential increases greatly during snow storms and high winds. In thunder storms it is subject to sudden and violent oscillations, as might be expected. Many theories have been proposed to account for the

electrification so observed, particularly for the enormously high potentials that are in evidence during thunder storms; but none has yet met with general acceptance. It was formerly thought that the evaporation and condensation of water had much to do with it, but no experimental evidence has been adduced to justify this hypothesis, although physicists have given it the most careful attention. Bartoli and Pettinelli made exhaustive experiments in connection with it, both with water and with organic compounds; but always without obtaining any favorable results. Kelvin, MacLean, and Gall observed electrification when dry air bubbled through a liquid, the air being electrified negatively in the case of pure water, and positively in the case of sulphuric acid or salt water. Apparently these are all friction phenomena, and it is not certain that they have any bearing on the electrical phenomena of the atmosphere. We know, from numerous experiments, that dust facilitates the condensation of aqueous vapor, and numerous authorities have endeavored to trace a similar connection between dust and the development of high electric potentials in the atmosphere. No certain results have been attained, however, as may be judged from the fact that in the 12 years immediately preceding 1902, no less than 25 new thunder-storm theories were proposed, 6 of these being published during the year 1895. See also METEOROLOGY; WIND.

Atmospheric Engine, an early form of pumping engine, invented by Papin in 1695 and subsequently improved by Newcomen and Watt. The steam cylinder is vertical and single acting, the piston being alternately forced upward by steam, and downward by the pressure of the atmosphere. See STEAM AND STEAM ENGINE

Atmospheric Line. See INDICATOR.

Atmospheric Railway, a railway in which the propulsive force designed to move the carriages along is that of the atmosphere. The notion of such a method of locomotion seems first to have suggested itself, in the latter part of the 17th century, to the French physician Papin, whose name is forever associated with the celebrated digester. In 1810, Mr. Medhurst published a work entitled 'A New Method of Conveying Letters and Goods by Air.' His proposal was to construct a close tunnel, in which the carriages,—the last of them provided with a piston fitting the tunnel,—should be propelled by air forced in behind them. Vallance, of Brighton, in 1825, recommended, as an improvement on this plan, the exhaustion of the air in front. About 1835, Henry Pinkus, an American, residing in England, patented a scheme for placing the carriages in the open air, but connecting them below with a small tunnel, having a narrow slit above, with ingeniously constructed apparatus to render the tunnel temporarily air-tight, notwithstanding the slit. Not much was done to carry out the patent; and Pinkus' scheme of what he called a pneumatic railway was considered as having failed, when, in 1840, Messrs. Clegg and Samuda brought forward a somewhat similar project under the name of the "Atmospheric Railway." An experimental fragment of line laid down near Wormwood Scrubs, just outside of London, on the Great Western line, was successful, as was

ATOLL—ATOMIC THEORY

one designed for actual use from Kingstown to Dalkey, in Ireland, another between London and Croydon, and a third in South Devon; but these have been since abandoned, and all that now remains to represent this mode of propulsion is the pneumatic dispatch tube, used for transmitting parcels to short distances. See WIRE-ROPE.

Atoll, a-töl', the Polynesian name for coral islands of the ringed type enclosing a lagoon in the centre. They are found chiefly in the Pacific in archipelagos, and occasionally are of large size. Suadiva Atoll is 44 miles by 34, and Rimsky 54 by 20. See CORAL ISLANDS.

Atomic'ity. See VALENCY.

Atomic Theory, in chemistry, the theory whose fundamental doctrine is that all matter is composed of ultramicroscopic particles, separated by spaces either entirely destitute of matter, or at least containing it in a very attenuated state. Such a theory was taught by Lucretius and other ancient philosophers, but the views of these early writers were necessarily vague and indefinite, and the atomic theory, as held by chemists of to-day, is generally attributed to the English scientist, John Dalton. In the early part of the 19th century Dalton called attention to the fact that when substances combine chemically they do so in certain definite proportions. His reasoning was something like this: In 100 pounds of carbon monoxid there are 42.9 pounds of carbon, and 57.1 pounds of oxygen. In the same weight of carbon dioxid there are 27.3 pounds of carbon, and 72.7 pounds of oxygen. These are merely experimental facts, obtainable by direct analysis, and they involve no hypothesis whatever. No particular relations are discernible among the numbers stated above; but Dalton discovered that if the same facts are stated in a different way, a very remarkable relation appears. Thus, suppose we calculate what weight of oxygen is combined *with each pound of carbon* in the two gases. In carbon monoxid we find that there are $57.1 \div 42.9 = 1.33$ pounds of oxygen to each pound of carbon, and in carbon dioxid we find that there are $72.7 \div 27.3 = 2.66$ pounds to each pound of carbon. One of these numbers being exactly twice the other, we conclude that carbon can unite with oxygen in two proportions, the quantity of oxygen, per unit weight of carbon, being twice as great in one case as in the other. Dalton observed similar relations among other compounds,—in fact, his theory first occurred to him while he was studying the simpler compounds of carbon and hydrogen; and after turning the matter over in his mind he came to the conclusion that the facts can best be explained by assuming that matter consists of exceedingly minute, indivisible particles or atoms, each of which has a definite weight. When two bodies combine chemically, he conceived their atoms to come together in pairs, or in threes, or fours, according to the compound formed; and he devised symbols to represent the various elementary bodies and their compounds. Thus oxygen was represented by a circle with a white centre, hydrogen by a circle with a dot in the centre, nitrogen by a circle crossed by a vertical straight line, and carbon by a solid black circle. His notation has no advantages over the one now in com-

mon use, and hence, in what follows, we shall adopt the modern symbols. As water was the only compound of oxygen and hydrogen that Dalton knew, he naturally represented it by the symbol OH, considering that in it the particles of oxygen and hydrogen are united in *pairs*. Taking the hydrogen atom as the unit, it follows that the weight of the oxygen atom must be 8, if Dalton's view of the composition of water is correct; for experiment shows that in a given mass of water there is eight times as much oxygen, by weight, as there is hydrogen. Carbon monoxid was represented by the symbol OC, and since for each unit of its oxygen (by weight) this gas contains $\frac{3}{4}$ of a unit of carbon, it follows that the atomic weight of carbon is $\frac{3}{4}$ of that of oxygen. Hence the weight of the carbon atom is 6, the weight of the hydrogen atom being arbitrarily taken, as before, as 1. Carbon dioxid was represented by the symbol OCO. Ammonia gas, being the only compound of hydrogen and nitrogen known to Dalton, was represented by the simple symbol NH, and since experiment shows that ammonia gas contains (by weight) $4\frac{2}{3}$ times as much nitrogen as hydrogen, the atomic weight of nitrogen must be $4\frac{2}{3}$, or 4.67. In presenting the foregoing sketch of Dalton's views, use has been made of better experimental data than were available in his time, in order that the relation of his system of atomic weights to the modern system may be more clearly seen. A few of his actual determinations of atomic weights, from the imperfect data that he had, are given in the accompanying table. These were published in

Element	Atomic Weight
Hydrogen	1 0
Nitrogen	4 2
Carbon	4 3
Phosphorus	7 2
Oxygen	5 5

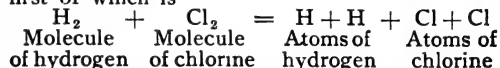
1805, and his general theory of chemical compounds was given in the first volume of his 'New System of Chemical Philosophy,' published in 1808. All subsequent researches have tended to confirm Dalton's fundamental conception, that matter is discontinuous in its ultimate nature, and consists of discrete atoms which come together in definite groups when chemical combination occurs. And we agree with him, to-day, in the belief that the so-called "atomic weights" of substances are really the *true relative weights of their atoms*; the weight of the hydrogen atom being taken as unity. Soon after Dalton's theory had been announced, it was observed that there are simple *volumetric* relations among *gases* when they combine. Thus it was noticed that 2 volumes of hydrogen combine with 1 volume of oxygen to form water; that 1 volume of hydrogen combines with 1 volume of chlorine to form 2 volumes of hydrochloric acid gas; and so on. This being the fact, it was suggested by Avogadro in 1811, and independently by Ampère in 1813, that all gases, when under the same conditions of temperature and pressure, contain the same number of constituent particles per unit of volume. This principle, known as "Avogadro's Law," has been of the greatest service to chemistry. Its truth was long questioned, but as it has led to results of great value, and has been found to be in conformity with all other known facts of

ATOMIC THEORY

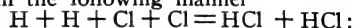
chemistry, it is now accepted without reserve as a fundamental principle of nature. Moreover, the kinetic theory of gases has shown that it is a mathematical necessity, if gases are admitted to consist of elastic particles, flying about through space, and colliding with one another, and with the walls of their containing vessels. (See GASES, KINETIC THEORY OF.) But if Avogadro's law be admitted to be a fact of nature, it becomes necessary, at once, to make an important modification in Dalton's theory. For it is plain that if 1 cubic inch of hydrogen, containing (say) n atoms, combines with 1 cubic inch of chlorine, also containing n atoms, to produce 2 cubic inches of hydrochloric acid gas, containing n constituent particles altogether, then the number of such particles in each cubic inch of the hydrochloric acid gas is only $n \div 2$; whereas Avogadro's law requires us to admit the existence of n particles per cubic inch, in the compound gas as well as in each of its constituents. It follows, therefore, that when the H and the Cl combine, their ultimate particles do not simply unite in pairs. There is no way to explain the observed facts, consistently with Avogadro's law, unless we assume that the ultimate particles of H and Cl are both compound, and that when these gases combine, their particles split in two, half a particle of the one combining with half a particle of the other, to produce a whole particle of HCl. In other words, Avogadro's law compels us to admit that the little corpuscles of which matter is composed, and which we have heretofore called atoms, are really (in some cases, at least) systems composed of still smaller bodies. To distinguish between the two kinds of particles—namely, between the systems and their component bodies—it therefore becomes necessary to introduce a new term. The systems are called "molecules" (literally, "tiny masses"), and their constituent parts are still called "atoms." To put the case in another way, the smallest parts into which a given substance can be conceived to be divided, without changing its chemical character, are called "molecules"; while the word "atom" is reserved for the smallest portion of a substance that can enter into a chemical combination. A molecule is a system of atoms capable of independent existence; and an atom is one of the parts into which the molecule of a substance divides, as a preliminary to entering into a chemical combination.

We have but little information, up to the present time, concerning the number of atoms entering into the molecules of the different elements. The molecules of cadmium, mercury, zinc, and indium are believed to be monatomic, at least when those bodies are in the gaseous state; so that in these cases there is no difference between a molecule and an atom. The same is apparently true of the newly discovered gases, argon, helium, neon, krypton, and xenon. Hydrogen, nitrogen, oxygen, selenium, and tellurium are believed to be diatomic; that is, their molecules are believed to contain two atoms each. Phosphorus and arsenic are believed to be tetratomic, their molecules containing four atoms each. Chlorine, bromine, and iodine are diatomic at temperatures below 1100° F., but above 1100° their molecules are believed (by some authorities) to break up into single

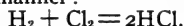
atoms, so that at about 2200° F. two thirds of the little particles present in these substances are free atoms, while the remaining one third continue to exist as diatomic molecules. Sulphur is hexatomic at 900° F., but its molecules break up somewhat at higher temperatures, and are practically all diatomic above 1500° . According to this view of the case, if H stands for the atom of hydrogen and Cl for the atom of chlorine, what happens when a molecule of one of these gases combines with a molecule of the other is not simply $H + Cl = HCl$, because the molecule of hydrogen must be represented by H_2 and that of chlorine by Cl_2 . Hence the process of combination consists of two parts, the first of which is



The atoms of hydrogen and chlorine, thus set free, then combine to form hydrochloric acid, in the following manner:



or we may write the whole operation in the following simple manner:



Dalton, assuming that the formula of ammonia is NH , and knowing by experiment that the weight of the nitrogen present is 4.67 times as great as the weight of the hydrogen, would conclude that the atomic weight of nitrogen is 4.67; but since experiment shows that when ammonia gas is separated into its constituent elements, 2 volumes of the ammonia yield 1 volume of nitrogen and 3 volumes of hydrogen, Avogadro's law requires us to conclude that the true formula for ammonia is NH_3 ; and hence we must take $3 \times 4.67 = 14$ as the atomic weight of nitrogen. This example will suffice to show how Avogadro's law obliged chemists to modify the atomic weights that would be obtained by the methods known to Dalton. Direct analysis of compounds of an element whose atomic weight is desired will give either that atomic weight itself, or some simple multiple or submultiple of it; but to decide between these several multiples (as for example between 4.67 and 14, in the case cited above), it is necessary to have recourse to Avogadro's law, or to some other equally general principle. Unfortunately Avogadro's law cannot always be applied to the determination of atomic weights, because it frequently happens that no compound of the element under examination can be obtained in the gaseous condition, or that the gaseous compounds that can be obtained are unsatisfactory, for one reason or another, and not adapted to the determination of the particular multiple that should be selected as the atomic weight of the element. In such cases recourse may be had to the law of Dulong and Petit, or to the "periodic law" of Meyer and Mendeléeff. In 1819 two distinguished French physicists, MM. Dulong and Petit, announced that the specific heats of 13 elements upon which they had made careful experiments are inversely proportional to the respective atomic weights of those elements. In other words, that the product of the specific heat and the atomic weight (which product is called the "atomic heat") is the same for all of them. This remarkable generalization did not meet with universal and immediate acceptance, because it failed in numerous cases unless the

ATOMIC THEORY

atomic weights of the corresponding elements were changed somewhat from the values that had been previously assigned to them from purely chemical considerations. Thus in the case of bismuth, platinum, silver, and cobalt, Dulong and Petit substituted multiples or submultiples of the atomic weights then in use; and other changes were also made. Moreover, the law could not possibly be exact, because the specific heats of bodies are not constant, but vary with the temperature, and sometimes to a considerable extent. Subsequent experimenters have paid great attention to Dulong and Petit's law, however, and now that the atomic weights of the more familiar elements have been pretty well determined in one way and another, the law is found to be surprisingly near to the truth, and most of the changes for which they contended, in connection with previously accepted atomic weights, have since been made. A list of ten elements whose specific heats have been well determined are presented in the table, to illustrate the degree of accuracy with which

Element	Atomic Weight	Specific Heat	("Atomic Product Heat")
Lithium	7.	0.941	6.6
Aluminum	27.	0.214	5.8
Potassium	39.	0.166	6.5
Copper	63.	0.0952	6.0
Silver	107.	0.0570	6.1
Antimony ..	119.	0.0508	6.1
Tungsten ..	183.	0.0334	6.1
Gold	196.	0.0324	6.4
Bismuth	207.	0.0308	6.4
Uranium ..	238	0.0277	6.6

a proposed element may be expected to conform to it. The atomic weights in the table range from 7 to 238, and yet when we multiply each one by the corresponding specific heat, we find that the product (or "atomic heat") remains constant, or nearly so. In some cases (notably for boron, silicon, and carbon), a large deviation from the law is observed; but these exceptions cannot be considered in the present place. As an example of the use of Dulong and Petit's law, the case of silver may be cited. Previous to the publication of that law, the atomic weight of silver had been taken at 215. Dulong and Petit pointed out that if this value were retained, the product of the atomic weight and the specific heat greatly exceeded the value 6, to which many of the other elements approximated. They therefore proposed to halve the then accepted atomic weight of this element, and to make (of course) a corresponding change in the formulas of all compounds of silver. Regnault confirmed their experiments, and repeated their demand that the atomic weight be halved. But Berzelius, then the greatest living authority on such matters, refused to consent to the change, on the ground that silver and sodium compounds are isomorphous (see ISOMORPHISM), and that the analogy between the formulas of their corresponding compounds would be destroyed, if the atomic weight of silver were halved, while that of sodium was left unchanged. Regnault then determined the specific heat of metallic sodium, and showed that the atomic weight of that element should also be halved, in order for it to conform to Dulong and Petit's law. Berzelius' objection thus lost its force, and the atomic weights of both silver and so-

dium were ultimately halved, by universal consent. The "periodic law," already referred to, cannot be adequately treated in this place (see PERIODIC LAW); but it may be said that when the known elements are arranged in the order of their atomic weights, it is found that certain attributes recur in a remarkable "periodic" manner, as we pass from one end of the array to the other. This fact is of great assistance in the determination of atomic weights, because any great error in the assignment of the atomic weight of an element would throw that element, among others with which it would have relations, entirely out of harmony with those that prevail in other parts of the array. This "periodic" classification is so powerful and far-reaching, that the existence of new and previously unsuspected elements has been predicted by it, and afterward verified (in some cases) by the actual discovery of the elements themselves. The newly discovered gas "argon" (q.v.) affords an interesting case of the determination of an atomic weight by indirect means. Argon has resisted all attempts to make it combine with other substances, and hence it has been impossible, thus far, to analyze any of its compounds. Its density was found, by direct experiment, to be about 20 times as great as that of hydrogen. Now if, as Avogadro's law states, a cubic inch of argon contains just as many molecules as a cubic inch of hydrogen (under the same conditions of temperature and pressure), then it follows that a molecule of argon weighs 20 times as much as a molecule of hydrogen, or 40 times as much as an *atom* of hydrogen. To find the weight of an atom of argon we therefore merely have to divide 40 by the number of atoms that there are in its molecule. For an explanation of the method by which the number of atoms in the molecule of such a gas is obtained, we must refer to the article GASES, KINETIC THEORY OF; it will suffice, in the present place, to state that it was found that argon is monatomic, its molecule containing but a single atom. Therefore the conclusion was, that the atomic weight of argon is about 40. The "periodic law" was not of any great service in this case, because the properties of the new gas proved to be so unlike those of any previously known substance that its proper place in the general scheme could not be even guessed until its atomic weight had been determined. The subsequent discovery of helium and the other inert gases of the same group showed, however, that the atomic weight already assigned to argon is in reasonably good accordance with the periodic law.

Chemists educated in recent years can hardly conceive the confusion that prevailed half a century ago, while the principles that have been outlined above were struggling for recognition and universal adoption. There was no agreement as to what atomic weights nor what formulas should be used. Mendeléeff says: "Some took $O=8$ and others $O=16$. Water in the first case would be HO and hydrogen peroxid HO_2 , and in the second case (as is now generally accepted) water would be H_2O and hydrogen peroxid H_2O_2 , or HO . Discussion and confusion were reigning. In 1860 the chemists of the whole world met at Carlsruhe for the purpose of arriving at some agreement on the subject. There was great difference of opinion,

ATOMIC THEORY

and a conditional agreement (or compromise) was proposed and defended with the greatest acumen by the ranks of science. A conditional agreement was not arrived at, and ought not to have been; but instead of it, truth, in the form of the law of Avogadro-Gerhardt, received by means of the Congress a wider development, and soon afterward conquered all minds. Then the new so-called Gerhardt atomic weights established themselves, and in the seventies they had already become generally used. As soon as a few of the atomic weights had been determined with some little degree of precision, it became evident that they came nearer to exact integers than one would naturally expect them to, judging from the theory of probability. As early as 1815, Prout made the assumption (since known as "Prout's Hypothesis") that the true values of these atomic weights are really integral numbers; and he drew the inference that all elements are composed of hydrogen. Thus nitrogen, whose atomic weight is almost exactly 14, he believed to contain 14 times as many atoms to the molecule as hydrogen contains, and he believed the fundamental atom to be the same in each case. There is nothing about this assumption which conflicts with what has been said above about nitrogen being a *diatomic* gas; for all that Avogadro's law positively shows is that when a molecule of that gas divides, it splits into *halves*, and therefore contains an even number of atoms. In the absence of any evidence to the contrary we assume it to be simply *diatomic*, although we must always remember that future research may require us to admit it to be *tetratomic*, *hexatomic*, or even more complex. Prout's hypothesis has provoked a great deal of discussion, and since it was first proposed it has been attacked and defended by many distinguished chemists; and although rather in disfavor at present, we can hardly yet say that it has been finally laid to rest. One can scarcely glance at a table of atomic weights (such as that here presented) without being impressed by the manifest tendency shown by these atomic weights to approach integral values. Of course there are conspicuous exceptions—chlorine, for example—but the fact that many of the atomic weights are nearly integral demands some sort of an explanation. What that explanation may ultimately prove to be, we cannot now guess; but it is possible that it will be found in the development of the remarkable corpuscular hypothesis of Prof. J. J. Thomson. (See ELECTRON.) The atomic weight of oxygen was long thought to be precisely 16; very careful experiments then indicated that 15.96 is a closer approximation to the real fact; and it has recently been ascertained that 15.88 is a still better approximation. It is a matter of choice what element is taken as having the atomic weight unity, hydrogen having been chosen for this purpose merely because it is the lightest element known. For many purposes it would be convenient if the atomic weight of oxygen were precisely 16; but this value is now known to be incompatible with the assumption that the atomic weight of hydrogen is 1. Chemists have therefore been in the habit, in recent years, of multiplying all the atomic weights, as deduced on the hypothesis that $H=1$, by a constant number, so determined as to make the atomic weight of oxygen come precisely 16. It

happens that this number is 1.008, and this is therefore the atomic weight that must be assigned to hydrogen, if we are to adopt a scale on which the atomic weight of oxygen is to be precisely 16. A majority of the chemists of the world now use this modified scale, on which the atomic weight of hydrogen is taken as 1.008, and the scale so established is known as the "International" scale of atomic weights. A table of the atomic weights of the elements, both for $H=1$, and for $O=16$, is presented herewith.

TABLE OF ATOMIC WEIGHTS

Element	Symbol	Atomic Weight	
		H=1	O=16
Aluminum....	Al	26.9	27.1
Antimony	Sb	119.1	120
Argon	A	39.6	39.9
Arsenic.....	As	74.4	75.
Barium	Ba	136.4	137.4
Bismuth	Bi	206.9	208.5
Boron	B	10.9	11.
Bromine.....	Br	79.36	79.96
Cadmium.....	Cd	111.6	112.4
Cæsium.....	Cs	132.	133
Calcium.....	Ca	39.7	40.
Carbon.....	C	11.91	12.
Cerium.....	Ce	139.	140.
Chlorine...	Cl	35.18	35.45
Chromium...	Cr	51.7	52.1
Cobalt.....	Co	58.56	59
Columbium...	Cb	93.3	94
Copper.....	Cu	63.1	63.6
Erbium.....	E	164.8	166.
Fluorine.....	F	18.9	19.
Gadolinium...	Gd	155.	156
Gallium	Ga	69.5	70
Germanium...	Ge	71.5	72.
Glucium.....	Gl	9.03	9.1
Gold.....	Au	195.7	197.2
Helium	He	4	4
Hydrogen.....	H	1	1.008
Indium.....	In	113.1	114
Iodine.....	I	125.9	126.85
Iridium	Ir	191.5	193.
Iron	Fe	55.6	56
Krypton.....	Kr	81.2	81.8
Lanthanum...	La	137.	138
Lead	Pb	205.35	206.9
Lithium	Li	6.98	7.03
Magnesium...	Mg	24.18	24.36
Manganese...	Mn	54.6	55
Mercury.....	Hg	198.8	200.3
Molybdenum..	Mo	95.3	96.
Neodymium...	Nd	142.5	143.6
Neon	Ne	19.9	20.
Nickel.....	Ni	58.3	58.7
Nitrogen.....	N	13.93	14.01
Osmium.....	Os	189.6	191.
Oxygen.....	O	15.88	16
Palladium...	Pd	105.2	106.
Phosphorus...	P	30.77	31.
Platinum.....	Pt	193.3	194.8
Potassium...	K	38.86	39.15
Praseodymium	Pr	139.4	140.5
Rhodium	Rh	102.2	103.
Rubidium...	Rb	84.76	85.4
Ruthenium...	Ru	100.9	101.7
Samarium...	Sa	148.9	150.
Scandium...	Sc	43.8	44.1
Selenium.....	Se	78.5	79.1
Silicon.....	Si	28.2	28.4
Silver.....	Ag	107.12	107.93
Sodium.....	Na	22.88	23.05
Strontium...	Sr	86.04	87.6
Sulphur.....	S	31.83	32.06
Tantalum.....	Ta	181.6	183.
Tellurium....	Te	126.	127
Thallium.....	Tl	202.6	204.1
Thorium.....	Th	230.8	232.5
Thulium.....	Tu	170	171.
Tin.....	Sn	117.6	118.5
Titanium.....	Ti	47.7	48.1
Tungsten.....	W	182.6	184.
Uranium.....	U	237.7	239.5
Vanadium.....	V	50.8	51.2
Xenon	X	127	128.
Ytterbium...	Yt	172.	173
Yttrium.....	Y	88.3	89.
Zinc.....	Zn	64.9	65.4
Zirconium...	Zr	90	90.7

ATOMIZER—ATRIUM

The many questions that suggest themselves as to the size and physical nature of atoms belong properly to the domain of physics, and are discussed under the heading **MOLECULAR THEORY**. The day will doubtless come when the physicist and the chemist will find some common ground for the discussion of the nature of atoms and molecules; but at present these two sciences deal with such widely different classes of phenomena that no such common ground can be discerned. The atom and the molecule of the physicist appear to be hardly capable of possessing the properties that the chemist demands; but it is likely that this difficulty will one day be overcome. See **CHEMISTRY**; **ELECTRON**; **MOLECULAR THEORY**; **GASES**; **KINETIC THEORY**; **OF**; **VALENCY**; **SPECTROSCOPE**; **PERIODIC LAW**.

Atomizer. For the forms of atomizer used in burning liquid fuel, see **PETROLEUM**.

Atone'ment, in Christian theology, the special work effected by the life, sufferings, and death of Christ. The first explicit exposition of the evangelical doctrine of the atonement is ascribed to Anselm, Archbishop of Canterbury, in the 'Cur Deus Homo' (1098). See Shedd, 'History of Christian Doctrine'; Maurice, 'Theological Essays' (1853); Hodge, 'The Atonement' (1886); Dale, 'The Atonement' (1885); Oxenham, 'The Catholic Doctrine of the Atonement' (1881).

Atos'sa, the daughter of Cyrus, 530 B.C. She was successively married to Cambyzes, Smerdis, one of the Magi, and Darius, son of Hydaspes, the last of whom she incited to invade Greece. The word served as a poetical name given by Pope, in his 'Moral Essays,' to Sarah, Duchess of Marlborough.

Atrato, a-tra'tō, a river of Colombia, of note, because it has repeatedly been made to bear a part in schemes for a ship-canal across the Isthmus of Panama. Rising on the Western Cordillera at an altitude of 10,560 feet, above sea-level, it runs 305 miles northwest through low, swampy country and falls by several mouths, interrupted by bars, into the Gulf of Darien. It is navigable by steamers for fully 250 miles, being 750 to 1,000 feet wide, and 8 to 70 feet deep. A route, surveyed by the United States government in 1871, proposed to connect the Atrato and the Jurador, flowing into the Pacific, by a canal 48 miles long. At the Paris International Congress (1879), that route was, with various others, discussed and rejected in favor of De Lesseps' line from Limon to Panama. Gold-dust is found in and about the Atrato.

Atrau'li, a town of India, in the northwest provinces. It is clean, well built, and has a good trade. Pop. 14,374.

Atrebrates, a-trēb'a-tēz, or āt're-bā'tēz, the ancient inhabitants of that part of Gallia Belgica afterward called *Artois*. A colony of them settled in Britain, in a part of Berkshire and Oxfordshire.

Atrek, a-trēk', a river of Asia, forming the boundary between Persia and the Russian Transcaspian territory, and flowing into the Caspian. Its length is over 300 miles.

Atreus, ā'troos, in fabulous history, the son of Pelops and Hippodamia. He and his brother, Thyestes, murdered their half-brother, Chrysippus, from jealousy of the affection en-

tertained for him by their father. Thereupon they fled to Eurystheus, with whose daughter, Aerope, Atreus united himself, and after the death of his father-in-law became king of Mycenae. Thyestes had two sons by the wife of his brother, and was banished by Atreus. Thirsting for revenge, Thyestes conveyed away secretly a son of his brother, and instigated him to murder his own father. This design was discovered, and the youth, whom Atreus thought to be the son of his brother, was put to death. Too late did the unhappy father perceive his mistake. A horrible revenge was necessary to give him consolation. He pretended to be reconciled to Thyestes, and invited him with his two sons to a feast, and after he had caused the latter to be secretly slain he placed a dish made of their flesh before Thyestes. When the father had finished eating Atreus brought the bones of his sons and showed him the dreadful revenge which he had taken. Atreus (or his son Pleisthenes) was the father of Agamemnon and Menelaus, who are hence called the Atridae, Atridēs (the singular) being often distinctively applied to Agamemnon.

A'treus, Treasury of, a subterranean building at Mycenæ, so styled by Pausanias and frequently referred to as "the tomb of Agamemnon." It is a vaulted tomb resembling a bee-hive in construction, its arch being composed of projecting horizontal courses of stone narrowing as the top is approached. It contains a circular chamber 50 feet wide with a smaller square one adjoining.

Atri, a'tre, Italy, the ancient *Adria*; a town of the province of Teramo, in Italy, 14 miles southeast of the city of Teramo, on the Brindisi R.R. There are some ruins of ancient walls and buildings. The cathedral is interesting for its frescoes, and a 15th-century painting of the Madonna worshipping the child. It manufactures silk, soap, and licorice. Pop. (1901) 13,448.

A'triplex, a large genus of succulent plants of the natural order *Chenopodiaceæ*, widely distributed in tropical and temperate climates. Many of the species are weeds, but some, known as saltbush (for example, *A. leptocarpa* and *A. semibaccata*) are used as forage plants in Australia, where they are native upon the alkali soils. They have also proved promising in the alkali soils of the western United States. (Consult Circular 3, Division of Agrostology, United States Department of Agriculture, Washington.) *A. hortensis*, orach (q.v.) or sea-purslane, an erect annual herb with yellowish-green or red leaves, was formerly very popular as a substitute for spinach and is still so used to some extent. A few species are also cultivated for ornament.

A'trium, the entrance hall and most important apartment in ancient Roman houses. It was usually ornamented with statues and various family relics, and in the roof there was an opening called the *compluvium*, toward which the roof sloped so as to throw the rain-water into a cistern in the floor known as the *impluvium*. In this room the nuptial couch was placed, and here the matron with the women of the household sat and spun. It was also used as a reception room for visitors and clients. In mediæval times, till the 12th century, the name was given to a cov-

ATROPA — ATTAINDER

ered court, somewhat on the model of the ancient atrium, constructed in front of the principal doors of an edifice. Later the cloister at the side of the church, for the use of the monks, took the place of the atrium.

At'ropa, a genus of plants of the natural order *Solanaceae*. Its best known species is probably *A. belladonna*. See BELLADONNA.

Atrophy, a term denoting a diminution in the size of the organs, or tissues that make up the body. It is part of the physiological process in its simpler forms, as many parts of the body atrophy and become of secondary service in adult life; the thymus gland and umbilical vessels being examples. It may also be a symptom of disease, particularly in affections of the nervous system in which the trophic fibres of an organ are involved. It may also indicate a perverted state of nutrition. See NUTRITION.

At'ropine, a crystalline alkaloid obtained from the deadly nightshade. It is extremely poisonous. Large doses cause delirium, convulsions, and finally stupor and death. It is employed for several purposes in medicine, to relieve pain or spasm, and to arrest excessive sweats. The physiological action of atropine is chiefly exerted on the nervous system. It is a strong stimulant, particularly of the motor and respiratory centres, and paralyzes the end filaments of many nerves, particularly those that supply the secretory glands, the involuntary muscles, and the heart. Its chief poisonous symptoms are, in the stage of excitement, dryness of the mouth and pharynx, with anesthesia, a hot dry skin, dilatation of the pupil with blurred vision, due to paralysis, extreme restlessness, due to the motor excitation, a noisy, busy, and incoherent brain action, perhaps a delirium, quickened pulse, quickened respiration. This stage may pass into one of depression in which the patient becomes comatose, the pulse and respiration become slowed and death results from asphyxia. Treatment of the poisoning should include prompt washing of the stomach, emetics being of no service because of the anesthesia, artificial respiration, infusions of hot coffee, and general supportive measures. See BELLADONNA; SOLANACEÆ.

Atropos, ā'trō-pōs, the eldest of the Fates, who cuts the thread of human life with her shears.

Atsuta, at-soo'ta, Japan, a town in the southern part of Honshu, practically a suburb of Nagoya, with which it is connected by rail. It contains a number of Shintoese temples, in one of which the sword forming part of the Japanese imperial regalia, is kept. Pop. (1898) 24,291.

Attaché, a'tā'sha', a military, naval or subordinate member of the diplomatic service attached to an embassy or legation. Modern usage in effect restricts the term to subordinate officers of an embassy or legation.

Attach'ment, in law, a taking of a person, goods, or estate by virtue of a writ or precept. It is distinguished from an *arrest* by proceeding out of a higher court by precept or writ, whereas the latter proceeds out of an inferior court by precept only. An arrest lies only against the body of a person, whereas an attachment lies

often against the goods only, and sometimes against the body and goods. It differs from a *distress* in that an attachment does not extend to lands, while a distress cannot touch the body. In the United States attachment may be defined as the taking into the custody of the law the person or property of one already before the court, or whom it is sought to bring before the court; also a writ for this purpose. To some extent it is of the nature of a criminal process. In some States a plaintiff can at the beginning of an action to recover money attach the property of the defendant as a security for the payment of the judgment expected to be recovered; and in case of recovery the property is applied in satisfaction of the judgment. But the more usual rule is that there can be no seizure of property, except in specified cases, till the rights of the parties have been settled by judgment of the court. The exceptions are chiefly in cases where the defendant is a non-resident or a fraudulent debtor, or is attempting to conceal or remove his property. In some States, attachments are distinguished as foreign and domestic—the former issued against a non-resident having property with the jurisdiction of the State, the latter against a resident in the State; jurisdiction over the person or property being necessary for an attachment. An attachment issued under a State law not adopted by Congress, or by a rule of court, cannot be sustained in a United States court. Money due to a seaman for wages is not attachable in the hands of a purser, the purser being a distributing agent of the government, and in no sense the debtor of the seaman.

Attack', a term denoting the opening act of hostility by a force seeking to dislodge an enemy from its position. It is considered more advantageous to offer than to await attack, even in a defensive war. The historic forms of attack are: (1) The parallel; (2) The form in which both the wings attack and the centre is kept back; (3) The form in which the centre is pushed forward and the wings kept back; (4) The famous oblique mode, dating at least from Epaminondas, and employed by Frederick the Great, where one wing advances to engage, while the other is kept back, and occupies the attention of the enemy by pretending an attack. Napoleon preferred to mass heavy columns against an enemy's centre. The forms of attack have changed with the weapons used. In the days of the pike, heavy masses were the rule, but the use of the musket led to an extended battle front to give effect to the fire.

Attain'der, the legal consequence of a sentence of death or outlawry pronounced against a person for treason or felony, the person being said to be attainted. It resulted in forfeiture of estate and "corruption of blood," rendering the party incapable of inheriting property or transmitting it to heirs; but these results now no longer follow. Formerly persons were often subjected to attainder by a special bill or act passed in Parliament. In the United States, the Federal Constitution declares that "No bill of attainder shall be passed, and no attainder of treason, in consequence of a judicial sentence, shall work corruption of blood or forfeiture except during the life of the person attainted."

ATTAIN — ATTERBURY

Attain', a writ at common law against a jury for a false verdict. It was abolished in England in 1825 except as to jurors guilty of embezzlement. See **ATTAINER**.

At'tal'ea, a genus of about 20 species of mostly tall, smooth-stemmed tropical American palms with large pinnate leaves sometimes used for thatch, mats, hats, etc., and with nut fruits enclosed in a fibrous husk. *A. funifera*, the piassaba palm of the coast provinces of southern Brazil, yields a cordage of great strength and durability in sea water. Its fruits (coquillanuts) are as large as ostrich eggs and are used like vegetable ivory (see **VEGETABLE IVORY**). The piassaba palm of northern Brazil is a different species. It furnishes a fibre which is exported. *A. excelsa* and *A. speciosa* furnish nuts which are burned in rubber-making to dry and color the rubber obtained from *Siphonia elastica*. *A. compta*, the pindóva or indajá palm, a handsome species with a wide-spreading crown, yields edible fruits as large as goose eggs. *A. Cohune*, indigenous to Honduras, supplies a fruit from which the oil is extracted for soap-making at home and abroad. Several species are cultivated in greenhouses, but are generally considered too slow of growth from seed to be satisfactory.

At'talus, the names of three kings of ancient Pergamus, 241-133 B.C., the last of whom bequeathed his kingdom to the Romans. All were munificent patrons of art and literature.

At'talus, Flavius Priscus, the emperor of the East for one year, 409-10. He was proclaimed by Alaric and his Goths, but soon deposed. Honorius later cut off his thumb and forefinger and banished him to the island of Lipari.

Attâr, ât-tar', Ferid eddin, celebrated Persian poet: b. near Nishapur, 1119; d. about 1229 (?). The son of a spicer, he followed his father's trade (whence his surname of Attâr), but afterward became a dervish and one of the greatest mystics of Persia. He is said to have been killed by a Mongol soldier during the invasion by Jenghiz Khan. Of his extant political works the most famous are: 'The Book of Council,' a series of didactic poems on ethics; 'The Parliament of Birds' (1184-7). His principal work in prose is 'Biographies of the Saints.'

At'tar, or Otto of Roses, a perfume extracted from rose petals. It is a volatile oil, of soft consistency, nearly colorless, and deposits a crystallizable substance partially soluble in alcohol. The best article is prepared at Ghazipoor in Hindustan; but is apt to be much adulterated with sandal wood and other oils. The whole country, for many miles around Ghazipoor, is a garden of roses, and in the spring of the year presents a most beautiful picture of red and green. The roses are used both for rose water and the oil of roses. The latter is obtained from the rose water by setting it out during the night in large open vessels, and early in the morning skimming off the essential oil, which floats at the top. The rose water after the removal of the oil is not so highly valued as before. It is estimated that 200,000 well-grown roses are required to produce half an ounce of the oil; and the value of this when it is manufactured is about \$40, and even

then it is likely to be adulterated. If warranted genuine, it sells for about \$50 or \$100 per ounce. Attar is also imported from Smyrna and Constantinople; but it rarely, if ever, arrives in this country pure. It is commonly adulterated with spermaceti and a volatile oil, which appears to be derived from one or more species of *Andropogon*, and which is called oil of ginger-grass, or oil of geranium. Pure attar of rose, carefully distilled, is at first colorless, but speedily becomes yellowish. It congeals below 80°; melts at 84°. At 57°, 1,000 alcohol dissolve 7½ oil, and at 72°, 33 oil. Specific gravity 872. Formula, C₂₁H₃₂O₂. Many attempts have been made to discover some chemical reaction which would reveal the falsification of attar with geranium oil, but hitherto mostly in vain.

Attempt', in criminal law an endeavor to accomplish a crime carried beyond mere preparation, but falling short of the execution of the ultimate design in any part of it. 5 Cush. Mass. 367. To constitute an attempt, there must be an intent to commit some act which would be indictable, if done, either from its own character or that of its natural and probable consequences. In some States an attempt to commit a crime is defined by statute. The statute in New York is substantially similar to that of other States. The Penal Code of New York, § 34, provides that "An act, done with intent to commit a crime, and tending but failing to effect its commission, is an attempt to commit that crime."

Attention. See **CONSCIOUSNESS**.

Atterbom, at'ter-bôm, Peter Daniel Amadeus, Swedish poet. b. Asbo, East Gothland, 19 Jan. 1790; d. Upsala, 21 July 1855. Having visited Germany and Italy in 1817-19, he formed ties of friendship with Schelling and Thorwaldsen; became instructor to Crown Prince Oscar, in 1820, and professor at the university in Upsala in 1828. He was unquestionably the foremost among the lyric poets of the romantic school in Sweden. His most celebrated work is 'The Isle of Blessedness' (1823), a romantic drama in the manner of Tieck; but he also wrote 'The Flowers,' a cycle of lyrics; 'The Blue Bird,' a play; and 'Swedish Seers and Poets,' a volume of criticism.

At'terbury, Francis, celebrated English prelate: b. Middleton Keynes, England, 6 March 1662; d. Paris, 15 Feb. 1732. He distinguished himself at the university as a classical scholar, and gave proofs of an elegant taste for poetry. In 1687 he took his degree of M.A.; is thought to have assisted his pupil, Boyle, in his famous controversy with Bentley on the Epistles of Phalaris. Taking orders in 1691 he settled in London, where he became chaplain to William and Mary, preacher of Bridewell, and lecturer of St. Bride's, and soon became distinguished by the spirit and elegance of his pulpit compositions, but not without incurring opposition, on the score of their tendency and doctrine, from Hoadly and others. Soon after the accession of Queen Anne he was made dean of Carlisle, and besides his dispute with Hoadly on the subject of passive obedience, he aided in the defense of the famous Sacheverell, and wrote 'A Representation of the Present State

of Religion,' deemed too violent to be presented to the queen, although privately circulated. In 1712 he was made dean of Christ Church, and in 1713 Bishop of Rochester and dean of Westminster. The death of the queen, in 1714, put an end to his hopes of further advancement; for the new king treated him with great coolness. Atterbury not only refused to sign the loyal declaration of the bishops in the rebellion of 1715, but suspended a clergyman for lending his church for the performance of divine service to the Dutch troops brought over to act against the rebels. Not content with a constitutional opposition, he entered into a correspondence with the Pretender's party, was apprehended in August 1722, and committed to the Tower; and in the March following a bill was brought into the House of Commons for the infliction of pains and penalties. This measure met with considerable opposition in the House of Lords, and was resisted by the bishop, who maintained his innocence with his usual acuteness and dexterity. His guilt, however, has been tolerably well proved by documents since published. He was deprived of his dignities, and outlawed, and went to Paris, where he chiefly occupied himself in study, and in correspondence with men of letters. But even here, in 1725, he was actively engaged in fomenting discontent in the Highlands of Scotland. As a composer of sermons he still retains a great portion of his original reputation. His letters, also, are extremely easy and elegant; but, as a critic and a controversialist, he is deemed rather dexterous and popular than accurate and profound.

Att'ic, pertaining to Attica or to Athens. Elegant; classical; poignant; characterized by keen intellect, delicate wit, sound judgment and expressive brevity; as, the Attic Muse. Attic dialect was the most refined and polished of all the dialects of ancient Greece; and in it wrote Solon, the lawgiver; Thucydides and Xenophon, the historians; Aristophanes, the comic poet; Plato and Aristotle, the philosophers, and Demosthenes, the orator. When, after the Macedonian conquest, Greek became the language of literature and diplomacy in most parts of the civilized world, the Attic came to be that dialect of the Greek tongue which was generally adopted.

Attic Order, in architecture, a low order, commonly used over a principal order, never with columns, but usually with antæ or small pilasters. It is employed to decorate the façade of a story of little height, terminating the upper part of a building; and it doubtless derives its name from its resemblance in proportional height and concealed roof to some of the buildings of Greece. In all the best examples, and especially in the remains of antiquity at Rome, the attic is decorated with a molded base and cornice; often with pilasters and figures, as in the Arch of Constantine. In modern architecture, the proportions of the attic order have never been subject to fixed rules, and their good effect is entirely dependent on the taste and feeling of the architect. **Attic base**: The base of a column consisting of an upper and lower torus, a scotia and fillets between them. **Attic story**: A term frequently applied to the upper story of a house, when the

ceiling is square with the sides, to distinguish it from a garret.

Att'ica, a State of ancient Greece, whose capital, Athens, was once the first city in the world. It is a peninsula, united, toward the north, with Bœotia, toward the west, in some degree, with Megaris, and extends far into the Ægean Sea at Cape Sunium (now Cape Colonna). The unfruitfulness of its soil protected it against foreign invaders, and the Athenians boasted of their ancient and unmingled race. The earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came 1550 B.C. with a colony from Sais, at the mouth of the Nile, to Attica, and is acknowledged as their first real king. One of Cecrops' descendants founded 11 other cities, which in after-times made war upon each other. Theseus compelled these cities to unite, and to give to Cecropia, now called Athens, as the capital city of the whole country, the supreme power over the confederacy. He founded the great feast called the *panathenæa*, watched over the administration of the laws, commanded the army, divided the whole people into three classes—noblemen, husbandmen, and mechanics. He embellished and enlarged Athens, and invited foreigners to people the country. After the death of Codrus, 1068 B.C., the monarchical form of government, which had continued 487 years from the time of Cecrops, was abolished. An archon, chosen for life, possessed the regal power. After 316 years the term of office of the archons was limited to 10 years, and 70 years later to 1 year, and their number was increased to 9. A regular code of laws was now needed. The archon Draco was commissioned to draw one up; but his severity disgusted the minds of the people, and 594 B.C. Solon introduced a milder code and a better constitution. He provided that the form of government should continue democratic, and that a senate of 400 members, chosen from the people, should administer the government. Pisistratus, a man of talents, boldness, and ambition, put himself at the head of the poorer classes, and made himself master of the supreme power in Athens. His government was splendid and beneficent, but his two sons could not maintain it. Cleisthenes, a friend of the people, exerted himself to prevent future abuses by some changes in the laws of Solon. He divided the people into 10 classes, and made the senate consist of 500 persons. Attica was already highly cultivated; the vintage and harvest, like all the labors of this gay people, were celebrated with dance and song, with feasts and sacrifices. Then came the splendid era of the Persian war, which elevated Athens to the summit of fame. Miltiades at Marathon, and Themistocles at Salamis, conquered the Persians by land and by sea. The freedom of Greece escaped the dangers which had threatened it; the rights of the people were enlarged; the archons and other magistrates were chosen from all classes without distinction. The period from the Persian war to the time of Alexander (500 B.C. to 336) was most remarkable for the development of the Athenian constitution. According to Bockh's 'The Public Economy of Athens,' Attica contained, together with the islands of Salamis and Helena, a territory of 847 square miles, with 500,000 inhabitants,

ATTICA — ATTLA

365,000 of whom were slaves. Cimon and Pericles (444 B.C.) introduced the highest elegance into Athens, but the latter laid the foundation for the future corruption of manners, and for the gradual overthrow of the state. Under him began the Peloponnesian war, which ended with the conquest of Athens by the Lacedæmonians. A more dangerous enemy rose in the north—Philip of Macedon. Athens, together with the other states of Greece, became dependent on the Macedonians. When they suffered themselves to be misled to support Mithridates against the Romans, they drew upon themselves the vengeance of Rome. Sulla captured the city, and left it only an appearance of liberty, which it retained until the time of Vespasian. This emperor formally changed it into a Roman province. After the division of the Roman empire, Attica belonged to the empire of the East. 396 A.D., it was conquered by Alaric the Goth, and the country devastated. Attica, along with the ancient Bœotia, now forms a nome or province (Attike and Viotia) of the kingdom. See **ATHENS**.

Attica, Ind., city in Fountain County, on the Wabash River and Wabash Railroad; 21 miles southwest of Lafayette. It has numerous manufactories, churches, schools, two banks, and a public library. Pop. (1900) 3,005.

At'ticus, Titus Pomponius, a noble Roman, the intimate friend of Cicero: b. 109 B.C.; d. 32 B.C. The Pomponian family, from which he originated, was one of the most distinguished of the *equites*, and derived its origin from Numa Pompilius. When he attained maturity, the republic was disturbed by the factions of Cinna and Sulla. His brother, Sulpicius, the tribune of the people, being killed, he thought himself not safe in Rome, for which reason he removed, with his fortune, to Athens, where he devoted himself to science. His benefits to the city were so great, that he gained the affections of the people in the highest degree, and acquired so thorough a knowledge of Greek, that he could not be distinguished from a native Athenian. When Rome had recovered some degree of quiet, he returned and inherited from his uncle 10,000,000 of sesterces. His sister married the brother of Cicero. Cæsar treated him with the greatest regard, though he was known as a friend of Pompey. After the death of Cæsar, he lived in friendship with Brutus, without, however, offending Antony.

At'ticus Herod'es, Tiberius Claudius, a wealthy Athenian; b. about 104 A.D.; d. about 180. He received a careful education under the most distinguished masters of the time, and specially devoted himself to the study of oratory, to excel in which seems to have been the ruling motive of his life, ultimately attaining to great celebrity as a speaker and as a teacher of rhetoric. Among his pupils were Marcus Aurelius and Lucius Verus. He was highly esteemed by the Antonines, particularly by Aurelius, and received many marks of favor, among others the archonship at Athens and the consulate at Rome. Atticus is principally celebrated, however, for the vast sums he expended on public purposes. He withdrew from Athens, and resided at his villa near Marathon, where he died about 180 A.D. None of his writings are extant.

Attila, ät'ti-lä (in German, *Etzel*), the son of Mundzuk, a Hun of royal descent, who followed his uncle, Roas, in 434, and shared the supreme authority with his brother, Bleda. These two leaders of the barbarians, who had settled in Scythia and Hungary, threatened the Eastern Empire, and twice compelled Theodosius II. to purchase an inglorious peace. The Huns themselves esteemed Attila, their bravest warrior and most skilful general. Their regard for his person soon amounted to superstitious reverence, and being now sole master of a warlike people, his unbounded ambition made him the terror of all nations; and he became, as he called himself, the *scourge* which God had chosen to chastise the human race. In a short time he extended his dominion over all the people of Germany and Scythia, and the eastern and western emperors paid him tribute. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners. Hearing a rumor of the riches and power of Persia, he directed his march thither, but was defeated on the plains of Armenia, and drew back to satisfy his desire of plunder in the dominions of the emperor of the East. He easily found a pretext for war, for all states which promised him a rich booty were his natural enemies, and all princes whom he hoped to conquer had broken alliances. The Emperor Theodosius collected an army to oppose his progress; but in three bloody battles fortune declared herself for the barbarians. Constantinople was indebted to the strength of its walls, and to the ignorance of the enemy in the art of besieging, for its preservation. Thrace, Macedonia, and Greece, all submitted to the savage robber, who destroyed 70 flourishing cities. Theodosius was at the mercy of the victor, and was obliged to purchase a peace. Attila now directed his eyes to Gaul. With an immense army he passed the Rhine, the Moselle, and the Seine, came to the Loire, and sat down under the walls of Orleans. The inhabitants of this city, encouraged by their Bishop, Agnan (Anianus), repelled the first attack of the barbarians, and the united forces of the Romans, under their general, Aetius, and of the Visigoths, under their king, Theodoric, compelled Attila to raise the siege. He retreated to Champagne, and waited for the enemy in the plains of Chalons. The two armies soon approached each other. Attila, anxious for the event of the battle, consulted the soothsayers, who assured him of a defeat. He concealed his alarm, rode through the ranks of his warriors, reminded them of their deeds, spoke of his joy at the prospect of a battle, and at the thought that their valor was to be rewarded. Inflamed by his speech, and by the presence of their leader, the Huns were impatient for battle. At length the ranks of the Romans and Goths were broken through, and Attila was already sure of the victory, when the Gothic prince, Thorismond, the son of Theodoric, poured down from the neighboring height upon the Huns. Attila, pressed on all sides, escaped with difficulty to his camp. This was perhaps the bloodiest battle which has ever been fought in Europe; for, according to contemporary historians, 106,000 dead bodies covered the field of battle. Attila caused all his camp equipage and treasures to be brought together into a heap, in

ATTITUDE—ATTORNEY-GENERAL

order to burn himself with them, in case he should be reduced to extremities. But the enemy were contented with collecting their forces during the night, and having paid the last honors to the dead body of King Theodoric (Dietrich), which they discovered with difficulty, they saluted his son, Thorismond, king upon the field of battle. Thus Attila escaped, but the Franks pursued him till he had passed the Rhine. He now demanded Honoria, the sister of Valentinian III., in marriage, and conquered and destroyed Aquileia, Padua, Vicenza, Verona, Bergamo, and laid waste the plains of Lombardy. The inhabitants fled to the Alps, to the Apennines, and to the small islands in the shallows (lagoons) of the Adriatic Sea, where they built Venice. The emperor had no army to oppose him; the Roman people and senate had recourse to tears and supplications. Pope Leo I. went with the Roman ambassadors to the enemy's camp and succeeded in obtaining a peace. Attila went back to Hungary. The Romans looked upon their preservation as a miracle, and the old chronicles relate that the threats of St. Peter and St. Paul had terrified Attila—a legend which the art of Raphael and Alghardi has immortalized. Not having obtained Honoria for a wife, Attila would a second time have demanded her, sword in hand, if the beautiful Ildico had not been added to his numerous wives, with whom he solemnly united himself (453). This circumstance hindered him from fulfilling his threats. On this occasion he gave himself up to all the extravagance of debauchery; but on the other day after the marriage, the servants and warriors impatient to salute their master, thronged into the tent: they found Ildico veiled, sitting by the cold corpse of her husband. During the night he had died of a hemorrhage. The news of his death spread sorrow and terror in the army. His body was enclosed in three coffins—the first was of gold, the second of silver, and the third of iron. The captives who had made the grave were strangled. The description that Jornandes has left us of this barbarian king reminds us of his Kalmuck-Tartar origin. He had a large head, a flat nose, broad shoulders, and a short and ill-formed body. See Thierry, 'Histoire d'Attila' (1814).

Attitude, an art term signifying an artistic pose or position assumed by living figures. Attitudes require a regular study, a part of which is a knowledge of anatomy. The art of exhibiting attitudes, at least in modern times, is of recent invention. At the end of the 18th century the celebrated Lady Hamilton began the practice, and imitated, with great talent, the attitudes of antique statues in many large towns of Europe, so that Sir William Hamilton could say that he possessed, in his wife, a whole collection of antiques. Her dress was a simple tunic, fastened with a ribbon tight under the breast, and a shawl. With these she imitated all the different draperies. On the continent of Europe this art was carried to much perfection by Mrs. Hendel Schutz, who exhibited attitudes, copied from the Greek, Egyptian, Italian, and German styles of art.

Attleboro, Mass., a town of Bristol County, 30 miles southeast of Boston, and 12 miles from Providence. It has good railroad connections, contains national banks, newspaper

offices, several churches, and a system of graded schools. The town is the seat of several important industries, the chief of which is the manufacture of jewelry and electro-plate. There are also manufactories of cotton, woolen, and knit goods, and of boots and shoes. Pop. (1900) 11,335. Consult Daggett, 'A Sketch of the Town of Attleborough' (1894).

Attock, āt-tōk', a town and fort of the Punjab, on the east bank of the Indus. Attock stands below the fort, established by the Emperor Akbar in 1581, to defend the passage of the river. The great railway bridge across the Indus here was opened in 1883. It has five arches 130 feet high, and renders continuous the railway connection between Calcutta and Peshawur (1,600 miles). The situation of Attock is important, whether in a commercial or in a military view. It is at the head of the steamboat navigation of the Indus, being 940 miles from its mouth. Taxila, where the Macedonians crossed the Indus, has been identified with Attock.

Attorney, āt-tūr'nī (*attornatus*, in Latin), a person appointed to do something for and in the stead and name of another. A public attorney or attorney at law is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. The term was formerly applied especially to those practising before the supreme courts of common law at Westminster, and corresponded to the term solicitor used in regard to the courts of chancery. As an attorney was almost invariably a solicitor, the two terms came to be generally regarded as synonymous. By the Judicature Act of 1873 all persons practising before the supreme courts at Westminster are now called solicitors. Attorneys or solicitors do not plead or argue in court on behalf of their clients, this being the part of the barristers or counsel; their special functions may be defined to be, to institute actions on behalf of their clients and take necessary steps for defending them, to furnish counsel with necessary materials to enable them to get up their pleadings, to practice conveyancing, to prepare legal deeds and instruments of all kinds, and generally to advise with and act for their clients in all matters connected with law. An attorney, whether private or public, may have general powers to act for another; or his power may be special, and limited to a particular act or acts. In Scotland there is no class of practitioners of the law who take the name of attorneys. A special attorney is appointed by a deed called a power or letter of attorney, and the deed by which he is appointed specifies the acts he is authorized to perform. It is a commission, to the extent of which only he can bind his principal. As far as the acts of the attorney, in the name of the principal, are authorized by his power, his acts are those of his principal. But if he goes beyond his authority, his acts will bind himself only; and he must indemnify any one to whom, without authority, he represents himself as an attorney of another, and who contracts with him, or otherwise puts confidence in him, as being such attorney.

Attorney-General, in English law, an important officer under the king, made by letters patent. His most important duties are to

ATTORNEY AT LAW—ATWATER

exhibit informations and prosecute for the crown in matters criminal, and to file bills in the exchequer in any matter concerning the king's revenue. The attorney-general of the United States is an officer appointed by the President. He is required by statute to give his advice and opinion upon questions of law whenever required by the president; to pass upon the validity of the title to public lands purchased for the erection of public buildings by the United States; when requested, to give his opinion to the head of any executive department on any questions of law arising in his department; to conduct and argue all cases in which the United States is interested, whenever he deems it best for the interests of the United States for him to do so; to exercise general superintendence and direction over the attorneys and marshals of all the districts in the United States and the Territories as to the manner of discharging their respective duties. The attorney-general is also a member of the Cabinet, and according to the provisions of the act of Congress of 19 Jan. 1886, is the fourth in succession, after the Vice-President, to the office of President in case of a vacancy in that office. In each of the United States there is an attorney-general, or similar officer, who appears for the people, as in England he appears for the Crown. Only a few of the duties of the attorney-generals in the various States are defined by statute, consequently, so far as applicable to our altered situation, jurisprudence, and system of government, attorney-generals of the various states are clothed with the common law powers of the attorney-generals of England. The attorney-general of England had the power (1) to prosecute all actions necessary for the protection and defense of the property and revenues of the Crown; (2) by information to bring certain classes of persons accused of crimes and misdemeanors to trial; (3) by "*scire facias*" to revoke and annul grants made by the Crown improperly, or when forfeited by the grantee thereof; (4) by information, to recover money or other chattels or damages for wrongs committed on the land, or other possessions of the Crown; (5) by writ of *quo warranto*, to determine the right of him who claims or usurps any office, franchise, or liberty, and to vacate the charter, or annul the existence of a corporation for violations of its charter, or for omitting to exercise its corporate powers; (6) by writ of mandamus to compel the admission of an officer duly chosen to his office, and to compel his restoration when illegally ousted; (7) by information to chancery, to enforce trusts, and to prevent public nuisances, and the abuse of trust powers; (8) by proceedings *in rem*, to recover property to which the Crown may be entitled, by forfeiture for treason, and property for which there is no other legal owner, such as wrecks, treasure trove, etc.; (9) and in certain cases, by information in chancery, for the protection of the rights of lunatics, and others who are under the protection of the Crown.

Attorney at Law, an officer of a court of justice employed by a party in a cause to manage it for him. Appearance by attorney has been allowed in England from the time of the earliest records of the courts of that country. Such appearances were first allowed in France by letters patent of Philip le Bel, 1290 A.D. No

one can, by consent, be the attorney of both the litigating parties in the same section or suit. The agreement of an attorney at law, within the scope of his employment, in general, binds his client (1 Salk. 86) as to amend the record, to refer a cause, not to sue out a writ of error, to strike out a *non pros*, to waive a judgment by default, etc. The principal duties of an attorney are to be true to the court and to his client, to attend to the business of his client with prudence, skill, and honesty (4 Burr. 2061, 72 Ga. 83); to keep his client informed as to the state of his business, and to keep his secrets confided to him as such, and an attorney is privileged from disclosing such secrets when called as a witness (16 N. Y. 180, 29 Vt. 701). An attorney is allowed considerable freedom of speech, and ordinarily, is not liable for the use of false, defamatory, or malicious language, provided it was material to the issues raised by the pleadings (Hastings v. Lusk, 22 Wend. N. Y. 410). He is liable, however, if his language is defamatory, if it can be shown that it was not relevant to the issues, and was used for the purpose of injuring the character of his adversary (1 Barn. & C. 258).

Attrac'tion, in physics, any force acting between two bodies, which tends to bring them nearer together, or to oppose their further separation. All attractions can be divided into two classes: (1) Those which act at sensible distances, such as gravity and magnetism, and (2) those which exert measureable effects only when the bodies are exceedingly close together. Cohesion and molecular forces are examples of the second class. See COHESION; ELECTRICITY; ETHER; GRAVITATION; MAGNETISM; MOLECULAR THEORY; SURFACE TENSION.

At'tribute, in philosophy, a quality or property of a substance, such as whiteness or hardness. A substance is known to us only as a congeries of attributes. In the fine arts an attribute is a symbol regularly accompanying and characterizing some personage. Thus the caduceus, purse, winged hat, and sandals are attributes of Mercury, the trampled dragon an attribute of St. George.

At'tucks, Crispus, a mulatto or half-breed Indian: b. about 1720. He was a leader of the mob, who, on 5 March 1770, provoked the English soldiers in Boston to open fire, which resulted in the death of Attucks and others and created the incident known as the "Boston Massacre." The English officer of the day and six of his men were tried for murder and acquitted by a jury.

At'water, Lyman Hotchkiss, American theologian: b. Hampden, Ct., 23 Feb. 1813; d. Princeton, N. J., 17 Feb. 1883. He was pastor of the First Congregational Church in Fairfield, Ct., in 1835-54; in the last named year becoming professor of mental and moral philosophy at Princeton College, and, in 1869, professor of logic, metaphysics, political science, economics and ethics there. He was the author of a 'Manual of Elementary Logic' (1867).

At'water, Wilber Olin, American chemist: b. Johnsburg, N. Y., 3 May 1844. He was graduated at Wesleyan University in 1865; made a special study of chemistry in the Sheffield Scientific School of Yale and the universities of Leipsic and Berlin. He has been

successively professor of chemistry in East Tennessee University, Maine State College, and Wesleyan University. He was director of the Connecticut Agricultural Experiment Station, 1875-7, and was appointed director of the Storrs (Conn.) Experiment Station in 1887. He has been connected for several years with the United States Department of Agriculture; has published a large number of papers on chemical and allied subjects; and since 1894, has given much attention to nutrition investigations.

Atwill, Edward Robert, American bishop: b. Red Hook, N. Y., 18 Jan 1840. He was graduated from Columbus University in 1862, and General Theological Seminary, 1864. He was rector of St. Paul's Church, Burlington, Vt., 1867-80; of Trinity Parish, Toledo, O., 1881-90; and was consecrated first Protestant Episcopal bishop of West Missouri, 14 Oct. 1890.

Atwood, Charles B., American architect: b. Millbury, Mass., 18 May 1849; d. Chicago, 19 Dec. 1895. He studied at the Harvard Scientific School, and opened an office in 1872. Within three years he received prizes for designs for the San Francisco city hall, the Connecticut State capitol, the court house in Springfield, Mass., and a commission to build the Holyoke, Mass., city hall. Removing to New York in 1875, he designed residences for W. H. Vanderbilt, Eliot F. Shepard, and W. D. Sloane, and interior decorations for the houses of Mrs. Mark Hopkins in San Francisco and Gt. Barrington, Mass. In 1884 he gained the first prize for a design for the Boston Public Library, and later a prize of \$5,000 for plans for a new city hall in New York city. From 1891-3 he was associated with D. H. Burnham in planning the World's Fair buildings in Chicago. The art building, peristyle, service building, and many minor features were from his designs. He was a close student of his art, and a marvelous draughtsman, using his left hand with sureness and rapidity. D. H. Burnham said of him, "He was of an honorable, charitable disposition, but like most great artists, a mere child in the practical things of life."

Atwood, George, an eminent English mathematician: b. London 1746; d. 11 July 1807. In 1874 he published 'Treatise on the Rectilinear Motion and Rotation of Bodies; with a Description of Original Experiments relative to that Subject'—a work remarkable for its perspicuity and the extensive information which it affords. About the same time he made public an 'Analysis of a Course of Lectures on the Principles of Natural Philosophy,' read at the University of Cambridge, which is not less valuable than the preceding. He published a 'Dissertation on the Construction and Properties of Arches' (1801), and several other valuable treatises relating to mathematics and mechanical science. He invented a machine still used in physical lecture-rooms, which affords great facilities for verifying the laws of falling bodies. See **ATWOOD'S MACHINE**.

Atwood, Isaac Morgan, American educator: b. Pembroke, N. Y., 24 March 1838. He was ordained in the Universalist Church in 1861; held several pastorates; edited *The*

Christian Leader (1867-73); became an associate editor of the *Universalist Leader*; and was chosen president of the Canton (N. Y.) Theological Seminary in 1879. His chief works are: 'Have We Outgrown Christianity?' (1870); 'Latest Word of Universalism' (1878); 'Manual of Revelation' (1888); 'Walks About Zion' (1881).

Atwood, Melville, Anglo-American geologist: b. 31 July 1812, Prescott Hall, England; d. Berkeley, Cal., 25 April 1898. He studied lithology, microscopy, and geology early in life, and engaged in gold and diamond mining in Brazil. In 1843 he made a discovery that greatly enhanced the value of zinc ore. After coming to the United States, in 1852, he invented the blanket system of amalgamation. He also established the value of the famous Comstock silver lode, by an assay of minerals in that region.

Atwood's Machine, an instrument devised by George Atwood, an English physicist, for illustrating the principles governing the motion of falling bodies, and described by him in a book published in 1784. It consists essentially of a light wheel or pulley, over which a thin, flexible cord passes. A mass of matter is attached to each end of the cord, and the experiment consists in observing the velocity acquired by the system at the end of a given time. The mass to be removed is evidently the sum of the two masses attached to the ends of the cord (assuming that the wheel is light enough to be disregarded); and the force tending to set the system in motion is the difference of the weights of the two masses. By making these masses nearly equal, the motion can be made slow enough to be conveniently studied. The intensity of gravity can be determined by the aid of this machine, with sufficient accuracy for class-room purposes, and it is an admirable device for illustrating the laws of uniformly accelerated motion. For a more detailed account see **GRAVITY**.

Atys, ä'tis, or Attys. (1) The favorite of Cybele, who, having broken the vow of chastity which he made to the goddess, castrated himself, as a punishment for his crime. (2) A son of Cræsus, king of Lydia—an affecting example of filial love. He was dumb, but, seeing a soldier in a battle who had raised a sword against his father, he exerted himself so much that the bands of his tongue gave way, and he cried out, "Soldier, kill not Cræsus!"

Aubanel, ô-bä-nél', The'odore, French poet, sometimes called "The Petrarch of France": b. 1829; d. 1886. He devoted his life to the restoration of the troubadour literature. His drama, 'Lou Pan don Pecat,' was successfully staged in 1878 at Montpellier.

Aube, ôb, a French department, formed out of the south of Champagne and a small portion of Burgundy; area, 2,351 square miles. The north and northwest districts are very bleak, bare of trees, and almost destitute of vegetation; the southern districts are remarkably fertile. The forests, which are extensive, furnish much fuel for the supply of Paris. The chief manufactures are worsted and hosiery. Troyes is the capital.

AUBE—AUBURN

Aube (ancient *Alba*), a French river which is tributary to the Seine, after a course of 113 miles. It is navigable to Arcis, a distance of about 20 miles.

Auber, ô-bâr', Daniel François Esprit, celebrated French operatic composer: b. Caen, 29 Jan. 1782; d. Paris, 13 May 1871. From natural inclination he devoted himself to the study of music, in which he had the assistance of Cherubini. His first decided success was his opera '*La Neige*,' produced in 1824. By this time he had associated himself with Scribe, a very skilful writer of *libretti*; and other operas now followed in quick succession, for which the words were supplied by Scribe, and the music by Auber. Some of these are still favorites, for example, '*Le Domino Noir*,' '*Les Diamants de la Couronne*' (Crown Diamonds), and above all, '*Fra Diavolo*,' and '*La Muette de Portici*' (usually known as '*Masaniello*'), in which last work he distinguished himself as a composer of serious opera, and attained a height which not one of his other works ever approached. His peculiar field, however, was the comic opera, in which by his charming melodies, bearing strongly the stamp of the French national character, as well as by his other excellences, he acquired general popularity. Consult Ferris, '*Great Musical Composers*' (1887).

Auberge, Rouge L', lô'bärzh' roozh, the title of a psychical romance by Balzac (1837).

Auberlen, ow'bér-lén, Karl August, German Protestant theologian: b. Fellbach, Württemberg, 19 Nov. 1824; d. Basel, 2 May 1864. He was educated at Tübingen, and made professor at Basel in 1851. He was author of '*The Divine Revelation: an Essay in Defense of the Truth*.'

Aubertin, ô'bër-tän', Charles, French scholar: b. St. Didier, 24 Dec 1825. He became rector of the Academy of Poitiers in 1874. His works include '*Critical Study of the Alleged Relations of Seneca to St. Paul*' (1857); '*Public Spirit in the Eighteenth Century*' (1873); '*Origins of French Language and Literature in the Middle Ages*' (1876-8), etc.

Aubigné, D', J. H. M. See D'AUBIGNÉ, J. H. M.

Aubigné, ô'be-nyä', Theodore Agrippa d', French soldier and author: b. Saint Maury (Saintonge), 8 Feb. 1552; d. Geneva, 29 April 1630. He fought under Henry IV., king of France, who made him a gentleman of his bed-chamber; but when the king, thinking it necessary, favored the Roman Catholics more than the Protestants, Aubigné expressed his displeasure with little reserve, and lost the favor of Henry. He now retired to Geneva, where he devoted himself to literary pursuits. He wrote a valuable '*Histoire Universelle*, from 1550 to 1601' (3 vols. folio), the first volume of which was ordered to be burned by the Parliament of Paris. A volume of sonnets and other poems, under the title '*Le Printemps*,' also bears his name.

Aublet, ô-blä', Albert, French painter: b. Paris. He studied historical painting under Gerome; won a first-class medal in the Paris Exposition of 1889, and the decoration of the Legion of Honor in 1890. His first great painting was the '*The Wash-room of the Reserves*

in the Cherbourg Barracks,' exhibited in the Salon of 1879, and probably his most celebrated one is the '*Meeting of Henri III. and the Duc de Guise*,' shown in the Salon of 1880.

Aubrey, â'bri, John, English antiquary: b. Easton Pierse, 1626; d. 1697. He published little, but left large collections of manuscripts, which have been used by subsequent writers. He collected materials for the '*Monasticon Anglicanum*, and afforded important assistance to Wood, the Oxford antiquary. His '*Miscellanies*' (1696) contains a great deal of curious and interesting information, but also displays much credulity and superstition. Another work of his was published in 1719 under the title of the '*Natural History and Antiquities of the County of Surrey*' In 1898 appeared a work by him entitled '*Brief Lives Chiefly of Contemporaries*,' edited by Andrew Clark.

Auburn, Ala., a town of Lee County, situated on the Western R.R. of Alabama, 60 miles north of Montgomery. It is the seat of the Alabama Polytechnic Institute, established in 1872. Pop. (1900) 1,447.

Auburn, Cal., a city and county-seat of Placer County, situated on the Southern P. R.R., 36 miles east of Sacramento. It was first settled in 1849 and was incorporated as a city in 1888. It is the seat of the Sierra Normal College. Gold and quartz is found in the vicinity and there are many quartz mills. The leading industries are mining, fruit-growing, and farming. Pop. (1900) 2,050.

Auburn, Ind., city and county-seat of De Kalb County, situated on branches of the Lake Shore & M. S., and the Baltimore & O. R.R.'s, 22 miles north of Fort Wayne. It has a thriving trade in grain, live stock, etc., and its chief manufactures are furniture, carriages, automobiles, gas engines, windmills, and stoves. Auburn was first settled in 1833, became a borough in 1836 and a city in 1900. The mayor and other officials are elected biennially. Pop. (1900) 3,396.

Auburn, Me., a city and county-seat of Androscoggin County, on the west bank of the Androscoggin River, and on the Maine C. and Grand Trunk R.R.'s, 33 miles north of Portland. It is finely situated both for beauty of scenery and for industrial advantages. The river, which here has a fall of about 60 feet, separates Auburn from Lewiston (q.v.), and the two cities are closely united in business and social interests. The extensive water-power at this point makes the site most favorable for manufacturing purposes.

Industries and Banks—The leading industries of Auburn are the manufacture of boots and shoes and cotton goods, and various forms of woodworking. In the boot and shoe industry it has long been prominent, and in this branch of manufacture is the foremost city of Maine, having seven factories and shops employing about 2,000 persons. The employees of the cotton factory number about 500, and those of the two woodworking shops 100. The city has three banks.

Churches and Schools.—The religious denominations having churches in Auburn are the Baptist, Congregationalist, Episcopalian, Free Baptist, Methodist, and Universalist. At the head of the public school system stands the Edward Little High School.

AUBURN—AUCKLAND

History and Government.—Auburn was first settled in 1786, and was originally a part of Minot, from which it was set off as a separate town in 1842. Its city charter was received in 1869. The population, of whom about one fifth are French Canadians, the rest being chiefly natives, was 12,951 in 1900, and in 1903 was estimated at 13,461.

GEORGE F. HUFF,
Editor of 'Auburn Advocate.'

Auburn, Neb., a city and county-seat of Nemaha County, situated on the Missouri P. and the Burlington & M. R. R.R.'s, 65 miles south of Omaha. It was first settled in 1861, became a borough in 1884 and a city in 1890. There are large fruit packing and canning plants and a flour mill here. Pop (1900) 2,664.

Auburn, N. Y., city, county-seat of Cayuga County; on Owasco River, the outlet of Owasco Lake, and on the New York Central and Lehigh Valley R.R.'s, 26 miles southwest of Syracuse. It was first settled in 1793 by Colonel John Hardenburgh, and was called Hardenburgh's Corners; in 1805 the name was changed to Auburn, and it was selected as the county-seat; in 1815 it was incorporated as a village, and in 1848 became a city. It is the seat of a session of the Federal Court. Auburn was the home of William H. Seward, of Gen John S. Clark, (Gen. Clark still lives here), the Indian archaeologist, and of Theodore Cuyler. It is situated on hills commanding an extensive view to the northeast; the head of Owasco Lake is only a few miles from the city limits to the south; and the course of the outlet of the lake is very picturesque until reaching the manufacturing district. This outlet furnishes excellent water power for the numerous industries which have made Auburn prosperous. The largest establishment is a manufactory of agricultural implements which exports its goods to every part of the world; other industries of almost equal importance are tool, carpet, and shoe factories, woolen mills, cordage factories, and breweries. The city has a progressive board of trade, and six banks, two of which are national banks having a combined capital of \$400,000. Auburn contains a number of fine public and private buildings, including a general hospital, costing \$100,000, a municipal hospital for contagious diseases, the court-house, the United States government building, the Case Memorial Library, and the Burtis Auditorium (erected 1904-5). There are 14 public grammar schools, the public high school, and 4 Roman Catholic parish schools. Auburn is also the seat of the Auburn Theological Seminary (Presbyterian), which, with its four buildings, Welch Memorial, and Dodge Library, Morgan Hall and Willard Memorial Chapels, forms another interesting feature of the city. In 1883 the 400th anniversary of Luther's birthday was celebrated at the Seminary by the planting at Morgan Hall of a sprig of ivy from Wartburg Castle, Luther's prison home. The city government is vested in a mayor, elected every two years, and a board of aldermen of 10 members; the mayor has the power of appointing the heads of the city departments. The municipality owns and operates the water-works. Pop. (1890) 25,858; (1900) 30,345.

CLINTON S. MARSH,

Superintendent of Schools, Board of Education.

Auburn, â'bûrn, the name of Goldsmith's 'Deserted Village,' generally supposed to be

Lissoy in Westmeath, Ireland, where the poet's boyhood was spent.

Auburn Theological Seminary, a Presbyterian institution in Auburn, N. Y.; organized in 1820. At the close of 1899 it had 9 professors and instructors, 91 students, 30,000 volumes in the library, grounds and buildings valued at \$300,000; aggregate endowment funds, \$626,417; income, \$66,736. Its graduates then numbered 1,500.

Aubusson, ô'bu-sôn', Pierre d', grand-master of the Knights of St. John of Jerusalem: b. 1423; d. Rhodes, 1503. He was descended from the old counts of LaManche in France, served, it is said, in early life in the wars against the Turks; some time after entered the order of St. John. He first obtained a commandery, next was made grand-prior, and in 1476, on the death of Grand-master Orsini, succeeded him. In 1480 the island of Rhodes, the headquarters of the order, was invaded by a Turkish army of 100,000 men. The town was besieged for 89 days and then assaulted, but the valor of D'Aubusson and his knights proved victorious, and the Turks were obliged to retire, leaving 9,000 dead and carrying off 15,000 wounded.

Auchmuty, ôk'mû-tî, Richard Tylden, American philanthropist: b. New York city, 1831; d. Lenox, Mass., 18 July 1893. He received a collegiate education; practised architecture for many years with James Renwick; served in the Union army through the Civil War; declined several public offices after its close, and with his wife founded the New York Trade Schools on an original plan, which soon became productive of large results, at a cost of \$250,000.

Auchmuty, Samuel, American clergyman: b. Boston, 16 Jan. 1722; d. New York city, 6 March 1777. He was admitted to the diaconate by the bishop of London, 1747, and entered the service of the Society for the Propagation of the Gospel, receiving an appointment as catechist to the negroes in Trinity Parish, New York. He became rector of Trinity in 1764, and during the Revolutionary War he remained a loyalist, continuing to read prayers for the king until compelled to desist and withdraw to New Jersey. When Gen. Howe took possession of the city Auchmuty passed the American lines with difficulty only to find his church in ruins and its records destroyed. The exposure he underwent in evading the Americans affected his health and led to his death.

Auckland, âk'lând, William Eden, LORD, English statesman and diplomatist: b. 1774; d. 1814. He had great influence in Pitt's ministry, and was employed in important embassies. Afterward, as a member of Parliament, he had a great influence in the reform of the penal laws, and, with Howard and Blackstone, in the organization of a new system of police, and a better mode of treating prisoners. He subsequently held the important post of secretary of state for Ireland, and in 1785 was ambassador extraordinary to the French court to negotiate a commercial treaty, which was concluded in 1786. During the first year of the French Revolution he was ambassador extraordinary to the states-general of the Netherlands; and in this capacity had great influence on the measures which the course of events was constantly rendering more complicated.

AUCKLAND — AUDETTE

Auck'land, a province of New Zealand, forming the northern part of North Island, and with an area of 25,746 square miles. Auckland, a city and capital of the province, and formerly capital of New Zealand, is situated on the northeast coast of North Island. It has two excellent harbors, one at Waitemata and one at Manukan on the opposite side of the isthmus. The former is one of the finest in New Zealand. There are numerous wharves and two graving docks, one of which, the Calliope dock, opened in 1887, is one of the largest in the South Seas. Connected with the chief towns of the island by rail the city has a large and increasing trade. The site is fine, and there are numerous handsome public buildings, including churches, fine schools, and the Auckland Institute. Chief manufacturing interests are ship-building yards, boiler works, glass works, shoe factories, etc. There is a United States consulate here. Pop. (1901) 34,216.

Auck'land Islands, a group of islands in the Pacific Ocean to the south of New Zealand. The largest island is about 30 miles long by 15 broad, and is covered with dense vegetation. They belong to the English government, almost entirely uninhabited, and serve as a station for whaling ships.

Auction and Auctioneer. An auction is a public sale of property to the highest bidder. It is not material how the sale is conducted, whether by public outcry or other manner. The essential part is the selection of a purchaser from a number of bidders. Catalogues describing the property are usually printed, the terms of the sale are also usually stated in the catalogue. Auctions are generally conducted by persons licensed for that purpose. Bidders may be employed by the owner of the property, if it be done *bona fide* and to prevent a sacrifice of the property under a given price, but where the bidding is fictitious and by combination with the owner to mislead the judgment or inflame the zeal of others it would be a fraudulent and void sale. Unfair conduct on the part of the purchaser will avoid the sale. Misdescription of property sold will avoid the sale if it is material. An auctioneer cannot bid for himself; he cannot deny his principal's title; he cannot sell at private sale; he has ordinarily the power to collect the purchase price of goods sold from the buyer. The auctioneer must use ordinary care and skill in the discharge of his duties, and like other agents he must obey the instructions he receives from the owner of property sent him for sale. An auctioneer, according to the weight of authority, who sells stolen property is liable to the owner, notwithstanding that the goods were sold by him, and the proceeds paid over to the thief without notice of the felony. An auctioneer is also liable for want of care of the goods while in his possession. The auctioneer has a lien upon the goods for the charges of the sale, and for his commission. He is the agent of the seller, and for same purposes, of the buyer.

Aucuba, â'kü-bä, a genus containing three species, of which *A. japonica* is the best known. They belong to the natural order *Cornaceæ*. The species mentioned is a dioecious evergreen laurel-like shrub of many varieties, native of China and Japan, largely planted on lawns and in shrubberies. It withstands the dust, smoke,

and gases of cities remarkably well, but is not hardy in the Northern States. The plants bear purple flowers in summer and the female ones are particularly beautiful when bearing their scarlet berries which ripen in early spring. It is easily propagated by seed, or by green wood cuttings, and succeeds in half shade where the soil is good, friable, moist, but well-drained.

Audæ'us (Syrian Udo), the founder of a religious sect called Audians, which held anthropomorphic views, and was established under the following circumstances. Audius (b at the end of 3d century; d 370), was a Mesopotamian, of singular purity and severity of character. He became disgusted with the Syrian clergy, and on expressing his opinion with more firmness than discretion, was excommunicated; when a considerable number of sympathizers gathered around him and constituted themselves into a church. But this sect could not long withstand the persecutions to which it was exposed, and died almost at the same time as its founder, who passed the latter part of his life in exile in Scythia, where he converted many pagans to Christianity by the force of his teachings, and the moral beauty of his ascetic life.

Aude, ôd, a maritime department in the south of France; area, 2,433 square miles. It is mainly covered by hills belonging to the Pyrenees or the Cevennes, and is traversed by a valley drained by the Aude. The loftier districts are bleak and unproductive; the others tolerably fertile, yielding good crops of grain. Its capital is Carcassonne. Pop. (1901) 311,386.

Aude, a river of France, which rises in the East Pyrenees, in the Department of Pyrénées Orientales, and after a course of nearly 130 miles, falls into the Mediterranean. It receives several affluents, of which the principal is the Orbieu.

Audebert, ôd-bär', Jean Baptiste, French naturalist and engraver. b. Rochefort, 1759; d. 1800. He went, at the age of 18, to Paris to learn drawing and painting, and made himself a skilful miniature painter. This occupation having awakened in him a taste for natural history, he undertook some works which laid the foundation of his fame. The first was 'Histoire Naturelle des Singes, des Makis, et des Galéopithèques' (1800), in which he shows himself an able draughtsman, engraver, and writer. Not satisfied with laying different colors on the same plate, so as to produce a kind of painting, he went farther, and, instead of water colors, used the more durable oil colors. He carried his art to still greater perfection by using gold in his impressions, the color of which he changed in different ways, in order to imitate the splendor of his patterns. Natural history was greatly benefited by his work, the splendor of which was astonishing. His 'Histoire des Colibris, des Oiseaux-Mouches, des Jacamars, et des Promerops' (1802), is esteemed the most complete work that has appeared in this department. Fifteen copies were struck off with golden letters.

Audette, â-dët', Louis Arthur, Canadian lawyer: b. Quebec, 14 Dec. 1856. He was educated at Quebec Seminary and Laval University; called to the bar in 1880; was secretary to the board of arbitrations appointed in 1893 to deter-

mine disputed matters of account between Canada and the provinces of Ontario and Quebec; and also became registrar of the exchequer court of Canada. He published 'The Practice of the Exchequer Court of Canada' (1895).

Audiffret-Pasquier, ô'dê-frâ'pas-kyâ', **Edme Armand Gaston, Duc d'**, French statesman: b. Paris, 1823. He was president of the National Assembly in 1875 and was the first life-senator appointed by that body. In 1878 he was chosen to the French Academy.

Au'diom'eter, for the measurement of hearing, an instrument devised by Prof. Hughes, the English inventor of the microphone. Among its constituent parts are an induction coil, a microphone key and a telephone. The audiometer has been materially modified, and is now principally used for obtaining a balance of induction from two electric coils acting upon a third. A scale is provided to show the extent of the movement. A varying or interrupted current being passed through the two outer coils, the preponderating current will produce the most induction if the central coil is equidistant. It can always be moved to such a point that there will be no inductive effect, one counteracting the other. Thus its position measures the relative induction. A telephone is in circuit with the intermediate coil and is used to determine when its position is such that no current is induced in it.

Au'diphone, an invention to assist the hearing of partially deaf persons in whom the auditory nerve is not entirely destroyed. The instrument, made of a thin sheet of ebonite rubber or hard vulcanite, is about the size of a palm leaf fan, with a handle and strings attached to bend it into a curving form, and a small clamp for fixing the string at the handles. The audiphone is pressed by the person using it against his upper front teeth, with the convex side outward; when so placed it communicates the vibrations caused by musical sounds or articulate speech to the teeth and bones of the skull, thence to the organs of hearing. For different sounds it requires to be focussed to different degrees of convexity. A simple strip of fine glazed mill-board has been recommended by some experimenters as cheaper and equally serviceable; and birch wood veneer has been used with success for the same purpose.

Au'dit, a term denoting an examination into accounts or dealings with money or property, along with vouchers or other documents connected therewith, especially by proper officers, or persons appointed for the purpose. Also the occasion of receiving the rents from tenants on an estate.

Audition. See EAR; HEARING.

Au'ditor. An auditor is an officer of the government, whose duty it is to examine the accounts of officers who have received and disbursed public moneys by lawful authority. In practice an auditor is an officer of the court, assigned to state the items of debit and credit between the parties in a suit where accounts are in question, and exhibit the balance. They may be appointed either by courts of law or equity. They are appointed at common law in actions of account, and in many of the States in other actions, under statutory regulations.

The auditor's report must state a special account, 4 Yeates, Penn. 514, giving items allowed and disallowed, 5 Vt. 70, but it is sufficient if it refer to the account, and it is their duty to report exceptions to their decisions of questions taken before them to the court, and exceptions must be taken before them, 4 Cranch, U. S. 308; 22 Bart. N. Y. 39; unless apparent on the face of the report. The report of the auditor as to facts is final in some of the States, unless impeached for fraud, misconduct, or very evident error. When the report is set aside in whole or in part, it may be referred back or may be rectified by the court, or accepted if the party in favor of whom the wrong decision is made, remits the item.

Auditory Canal. See EAR.

Auditory, or Eighth, Nerve, the nerve of hearing, and of the sense of position. It has its origin in two distinct portions of the ear, in reality being two distinct nerves, the *cochlear* and the *vestibular*, both of which are sensory in their function. The cochlear nerve originates in the cells of the organ of Corti in the cochlea of the ear, and is the one that carries sound impressions into the brain. The vestibular nerve has its origin in the semicircular canals and is the nerve that conveys the sense of localization of position. Both of these nerves soon join and run together in the internal meatus, where they lie in the same sheath for some distance with the seventh or facial nerve. They enter the medulla, the cochlear nerves forming the acoustic striæ on the floor of the fourth ventricle, and end about the superior olivary body and the nucleus of the trapezium. From here the fibres enter the fillet and end about the auditory centre in the brain in the second temporal convolution. Disease here causes auditory aphasia. The fibres of the vestibular branch end in the nuclei of Deiters and Bechterew in the medulla, and then further fibres pass for the most part into the cerebellum. Disease here causes cerebellar ataxia. See ATAXIA; APHASIA; EQUILIBRIUM; HEARING.

Audley, a manufacturing town in Staffordshire, England. Pop (1901) 13,700.

Audouard, ô'dowar', **Olympe**, French writer: b. 1830; d. 1890. She was married to a notary in Marseilles, but soon after divorced. She traveled in Egypt, Turkey, and Russia; and having conducted various journals in Paris since 1860, made a successful lecture tour through the United States in 1868-9. After her return she became interested in spiritism. She was an ardent advocate of woman's rights. Among her novels and books of travel may be mentioned: 'How Men Love' (1861); 'The Mysteries of the Seraglio and of the Turkish Harems' (1863); 'The Mysteries of Egypt Unveiled' (1865); 'War to Man' (1865); 'Across America' (1869-71); 'Parisian Silhouettes' (1883).

Audouin, ô'dooän', **Jean Victor**, French naturalist: b. Paris, 1797; d. 1841. He was professor of entomology in the Paris natural history museum and was the founder and first president of the Entomological Society. He wrote much respecting the injuries done by insects to vine and silk culture.

Audran, ô-drân', **Edmond**, French composer: b. Lyons, 1842; d. 1891. He composed several comic operas which were exceedingly

popular, among them 'La Mascotte' (1881); 'Olivette'; 'La Grand Mogul' (1884), 'Miss Helyett' (1890); 'La Ponpée.'

Audran, ô-dran', **Gerard**, French engraver: b. Lyons, 1640; d. Paris, 1703. After three years at Rome, where he acquired a high reputation by his engraving of Pope Clement IX., was recalled to France by Colbert, and appointed engraver to Louis XIV. Here he engraved the works of Lebrun, illustrating the battles of Alexander, and many paintings by Raphael, Titian, Domenichino, Poussin, and others. His nephews, **BENOTT** (b. 1661, d. 1721) and **JEAN** (b. 1667, d. 1756), were also engravers.

Au'drey, Saint. See **ETHELREDA**.

Audrey, â'drî, a shepherdess in Shakespeare's comedy 'As You Like It.'

Audsley, George Ashdown, Scottish-American architect: b. Elgin, Scotland, 6 Sept. 1838. He established himself in the United States in 1892, and subsequently became prominent both as an architect and author. In collaboration with his brother, **WILLIAM J. A. AUDSLEY**, he was author of several works—on illuminating, decorating, Christian symbolism, etc., and, individually, published 'Keramic Art of Japan'; 'Ornamental Art of Japan'; 'The Art of Chromolithography'; 'The Practical Decorator,' etc.

Audubon, â'dü-bôn, **John James Laforest**, American naturalist: b. Mandeville, La., 4 May 1780; d. 27 Jan. 1851. From 1827-38 he published a series of 1,065 colored figures of American birds in a descriptive work, 'The Birds of America,' which still holds its place as one of the most attractive and beautiful ornithologies of the world. He was a keen and sympathetic observer, rather than a trained specialist either in science or art. The full details of his life may be found in 'Audubon and His Journals,' by his granddaughter, Maria R. Audubon, with zoological and other notes by Elliott Coues (1897) and in an earlier biography by Lucy Audubon, as well as in 'The Life and Adventures of J. J. Audubon, the Naturalist,' by Robert Buchanan (1869). He was educated in France, and studied drawing for some time under the great artist, David, but in 1798 he returned to America and took possession of a farm owned by his father on the Perkiomen River, near Philadelphia. Here, in 1808, he married Lucy Bakewell, the daughter of an English neighbor; with her he moved to Kentucky and subsequently to Louisiana, meeting in both places with financial misadventures due to his inadaptability to attend properly to trade, which left him so poor that he was obliged to paint portraits and teach dancing and fencing. From his boyhood, however, in all fortunes, he had spent much time in sketching birds and studying their habits, and in 1826 he found means to take these sketches to England, where he elaborated them into the great series which made him famous and relieved his pecuniary troubles. In 1830 he returned to America to travel for new material and, in 1831, began the publication of his 'Ornithological Biography,' in five volumes. In 1842, after 12 years spent chiefly in explorations, he bought a home on the Hudson River at a spot considerably north of New York city at that time, but now

within the city limits and known as Audubon Park; here his two sons, Victor Gifford and John Woodhouse Audubon, also lived with their families. In 1843 the naturalist took another long journey, going to the Missouri River region. After 1844 he devoted himself with Dr. John Bachman (q.v.) and his sons, to a new publication, 'The Quadrupeds of America.' After 1847 his health began to fail. He was buried in Trinity Cemetery, New York.

Audubon Societies are organizations of bird-lovers who work to educate public opinion to a proper appreciation and protection of bird-life. They have now (1903) been organized in 30 States and have 60,000 members. Thus the efforts of a few lovers of birds have developed into a widespread movement of national importance. Hundreds of thousands of circulars, explaining the economic, educational, and esthetic value of birds, were distributed. Meetings were held; classes for bird-study formed. Whenever public opinion in a State seemed ripe, a bill was introduced in the legislature and many a law-maker was surprised to discover an active interest in birds that he had never suspected. Even the department of Agriculture at Washington began to inform him of their economic value. The bird law of the American Ornithologists' Union, which forbids the killing at any time of non-gamebirds, has been adopted in all the New England States, in New York, New Jersey, Delaware, Florida, Ohio, Kentucky, Indiana, Illinois, Wisconsin, Arkansas, and Wyoming. It is probable that within 10 years birds will be protected by law practically throughout the Union. But even then the labors of the Audubon Societies will by no means end. The laws must be enforced and the public conscience kept alive until sentiment enforces them.

Auenbrugger von Auenbrug, ow'en-brug'-ër fön ow'en-brug, **Leopold**, Austrian physician: b. Gratz, 1722; d. Vienna, 1809. As early as 1754 he had discovered the method of studying internal diseases (percussion) which made him famous; but not until after seven years of experiments and verification did he publish his treatise, entitled 'Inventum Novum ex Percussione Thoracis Humani Interni Pectoris Morbos Detegendi' (1761).

Auer, ow'er, **Adelheid von**, pseudonym of **CHARLOTTE VON COSEL**, German novelist: b. Berlin, 6 Jan. 1818. She is the author of many stories of real life, among them, 'Footprints in Sand' (1868); 'A Sister of Charity' (1870); 'In the World's Labyrinth' (1878); 'Castles in the Air' (1882).

Au'er, Alois, RITTER VON WELSBACH, Austrian printer: b. Wels, 1813; d. 1869. He was trained as a compositor and in his leisure moments acquired several languages, becoming a professor of Italian in the Gymnasium of Linz. From 1841 to 1868 he was at the head of the imperial printing office at Vienna. He made many typographical discoveries and published 'Die Sprachenhalle oder das Vaterunser in 608 Sprachen' (1844); and 'Das Vaterunser in 206 Sprachen' (1847).

Auerbach, ow'er-bah, **Berthold**, German novelist: b. Nordstetten, Wurtemberg, 28 Feb. 1812; d. Cannes, France, 8 Feb. 1882. He began to write while a student in Heidelberg, and under the pseudonym "Theobald Chauber" pro-

duced a 'Biography of Frederick the Great' (1834-6). A series of novels from the history of Judaism, under the collective title 'The Ghetto,' of which 'Spinoza' (1837) and 'Poet and Merchant' (1839) were printed in separate editions, was followed by a translation of Spinoza, with a critical biography (1841). 'Black Forest Village Stories' (1843), was received with universal favor, translated into nearly all European languages, and established his fame. To this class of tales belong also 'The Professor's Lady' (1847); 'Little Barefoot' (1856); 'Joseph in the Snow' (1860); 'Edelweiss' (1861); 'After Thirty Years' (1876). His first effort in the field of the novel, 'New Life' (1851), met with little favor; but 'On the Heights' (1865) constituted the crowning success of his literary career. It was followed by 'The Villa on the Rhine' (1868); 'Waldfried, a Family History' (1874); and 'The Head Forester' (1879).

Auerbach, Henry: b. 1482, at a place of the same name in Bavaria, the builder of the Auerbach court and cellar at Leipsic, mentioned in Goethe's 'Faust'. The building was erected in 1530, and tradition reports that five years after Dr. Faust was seen riding out of it on a barrel of wine. This tale Goethe has made use of in his famous poem.

Auerbach's Kell'er. See AUERBACH, HENRY.

Auerlite, a rare North Carolina mineral, remarkably rich in thorium, named after Dr. Carl Auer von Welsbach, the inventor of the Welsbach incandescent gas mantle. It was originally described as a hydrous silico-phosphate of thorium, $\text{ThO}_2(\text{SiO}_2 \cdot \frac{1}{2}\text{P}_2\text{O}_5) + 2\text{H}_2\text{O}$. It occurs in yellowish, zircon-like crystals of resinous lustre and having a hardness of 2.5 to 3 and a specific gravity of 4.1 to 4.7.

Auerstadt, ow'er-stët, a village in Saxony, famous for the great battle which took place there 14 Oct. 1806, between the French under Davoust, and the Prussian army under Duke Charles of Brunswick, which ended in a great victory for the former. The Prussians, who numbered 48,000, left nearly half of their men dead or wounded on the ground, while the French (30,000) escaped with a loss of only 7,000. Napoleon made Davoust Duke of Auerstadt.

Augean (â'jē-an) **Co'dex** (*Codex Augiensis*), a noted Greek and Latin MS of the Epistles of St. Paul, supposed to have been written in the 9th century, and so called from *Augia Major*, the name of a monastery at Rheinau. After passing through several hands it came, in 1718, to Dr. Bentley, who purchased it for 250 Dutch florins, and is now in the library of Trinity College, Cambridge. This MS. is written in uncial letters, and without accents; not *continua serie*, as is common with the more ancient copies, but with intervals between the words, and a dot at the end of each. The Greek text is written in capitals, the Latin in Anglo-Saxon letters; hence it is tolerably clear that it must have been written in the west of Europe, where that formation of the Latin letters, usually called *Anglo-Saxon*, was in general use between the 7th and 12th centuries.

Au'geas, in Greek legend, a king of Elis, famed for his stable, which contained 3,000 oxen and had not been cleaned for 30 years. Hercules was desired to clear the filth away in one

day, and Augeas promised if he performed it to give him a tenth part of the cattle. This task Hercules is said to have executed by turning the River Alpheus, or as some say, the Peneus, through the stable, which immediately carried away the dung and filth. Augeas refused to perform his engagement. Upon this a war ensued and Hercules conquered Elis and put Augeas to death.

Au'ger-shell, a common designation of the spiral gastropod mollusks of the *Tereboidæ* family. The shells are slender and tapering, sometimes ending in a sharp point, and are usually decorated with brown, orange, and red spots or patches. More than 200 species are known, all inhabitants of tropical waters, where they occur from the shallow waters of the shore to very great depths.

Augereau, ôzh-rô', **Pierre François Charles,** Duke of Castiglione, a marshal of France: b. Paris, 1757; d. 12 June 1816. He distinguished himself in 1794 as general of brigade in the army of the Pyrenees, and in 1796 as general of division in the army of Italy. He made himself master, 16 April, of the entrenched camp of the Piedmontese at Ceva, afterward of that at Casale; threw himself on the Bridge of Lodi, and carried it with the enemy's intrenchments. 1 August he came to the assistance of Masséna; maintained during a whole day a most obstinate struggle against a superior number of troops and took the village of Castiglione, from which he derived his ducal title. In the battle of Arcole, when the French columns wavered, Augereau seized a standard, rushed upon the enemy, and gained the victory. The directory bestowed this standard on him 29 Jan. 1797. In 1799 he was chosen a member of the Council of Five Hundred, and therefore resigned his command. He then obtained from the consul Bonaparte the command of the army in Holland. Being superseded in October 1801, he remained without employment till 1803, when he was appointed to lead the army collected at Bayonne against Portugal. When this enterprise failed, he went back to Paris, and 19 May 1804, was named marshal of the empire, and grand officer of the Legion of Honor. In July of this year the king of Spain sent him the order of Charles III. He contributed to the successes which gave birth to the peace of Pressburg, and in March 1806, had possession of Wetzlar and the country around, until, in the autumn of this year, a new war called him to Prussia. Early in 1811 Napoleon gave him the command of a corps in the army of Spain. After the entrance of the allies into France, he made submission to Louis XVIII., who made him a peer. Napoleon, on his landing in 1815, declared him a traitor. Augereau, however, expressed himself in his favor, but took no active part in the new order of things. After the return of the king he took his place again in the chamber of peers.

Augier, ôzh-yā', **Guillaume Victor Emile,** (ôzh-yā'), French dramatic poet: b. Valence, 20 Sept. 1820; d. 25 Oct. 1889. 'La Cigüe,' his first piece, in two acts, after being rejected at the Théâtre Française in 1844, was accepted by the managers of the Odeon Théâtre, and there brought out. It had a run of three months, and established the popularity of the author. The

AUGITE — AUGUST

latter subsequently produced other light pieces. These, however, were thrown in the shade by 'Gabrielle,' a five-act comedy, which has been pronounced by competent critics to be Augier's most finished and best constructed work, whether as regarding lot, poetry or the delineation of character. At the solicitation of Mlle. Rachel, Augier wrote 'Diane.' In 1868 his 'Fils de Giboyer' was successful. The style of Augier is at once classic and easy, dignified and yet pictorial. He may be said to have founded a new school in French dramatic literature, and his works, partly by their originality, and partly by intrinsic merit of a kind possessed in common with other dramatic productions, have acquired very great popularity.

Aug'ite. See PYROXENE.

Augsburg, owgz'bürg, a city of Bavaria; situated on a plain, 35 miles northwest of Munich. It was founded by the Emperor Augustus, 12 B C. The streets are narrow but picturesque, the buildings retaining many mediæval characteristics. Among the most notable are the cathedral, arsenal, town hall and Abbey of St. Ulrich. Napoleon III. received his early education in a gymnasium of this city. It is a centre of the book trade. Augsburg has been prominent since the Middle Ages for its commercial and financial operations and was long the home of merchant princes such as the Fuggers. It was the scene of the Augsburg Diet. It was a free city till 1806, when Napoleon ceded it to Bavaria. Pop. (1900) 88,700.

Augsburg Confession, a document adopted by the Protestants in 1530 as a declaration of faith. Charles V., on his accession to the throne of Germany (1520), found his new dominion the theatre of religious dissensions. The insurrection in Castile, and the war with France and Italy, called Charles into Spain, diverting his attention from the Lutheran schism. The Diet of Spires (1529) had issued a decree for the purpose of conciliating the Lutherans to the proposed Roman Catholic reform, and uniting them against the Sacramentarians and Anabaptists. At this juncture, Charles returned, and the German princes and estates were summoned to convene in diet at Augsburg in June. The summons was conciliatory, and called for aid against the Turks, making no reference to the religious difficulties of the kingdom, further than to promise at no distant time a speedy adjustment of them. On the 25th of the month, a confession, prepared by Melancthon, and approved by Luther, was presented and read by Dr. Christian Bayer in the diet. This confession is said to have been prepared on the basis of the Swabach and Torgau articles, although these had been drawn up (1528-9) in the attempt to unite with the Zwinglians, and the object of the present confession was to become reconciled to the Roman Catholic reform party. A copy of the confession, in German and English, was delivered to Charles. Two days after the reading of the confession, it was delivered to the Roman Catholic theologians for a reply. The reply was read in the diet on 3 August following, and called forth from Melancthon a defense (*Apologetica Confessionis*), which was afterward enlarged and published in Latin, and then in German. The object of the Augsburg Confession was not attained, and the edict of the emperor

(22 September) gave the Lutherans until the following April to bring themselves into conformity with the requirements of the Church, and required their co-operation with the throne against the Zwinglians and Anabaptists. The Augsburg confession and Melancthon's defense were generally circulated in western Europe, and became a sort of rallying point among the reformers.

Augsburg, League of, a league concluded at Augsburg, 9 July 1686, for the maintenance of the treaties of Münster and Nimeguen, and the truce of Ratisbon, and to resist the encroachments of France. The contracting parties were the Emperor Leopold I., the kings of Spain and Sweden, the electors of Saxony and Bavaria, and the circles of Suabia, Franconia, upper Saxony and Bavaria.

Augsburg Seminary, an educational institution in Minneapolis, Minn., under the auspices of the Lutheran Church. It was organized in 1869 and reported in 1902: Professors, 10; students, 170; grounds and buildings valued at \$50,000; income, \$12,250; graduates, 374.

Au'gur, Christopher Colon, American military officer: b. New York, 10 July 1821; d. Washington city, 16 Jan 1898. He was graduated at the United States Military Academy in 1843; became major of the 13th United States Infantry in 1861; colonel of the 12th Infantry in 1866; brigadier-general, United States army, 4 March 1869; major-general in the volunteer service in 1862; mustered out of that service in 1866; and was retired in the regular army, 16 July 1885. He commanded a division in the battle of Cedar Mountain, being severely wounded.

Au'gur, Hezekiah, American sculptor: b. New Haven, Conn., 21 Feb. 1791; d. 10 Jan. 1858. 'Jephthah and His Daughter,' in the Trumbull gallery at Yale, is the most important of his works. In addition to his skill as a sculptor, he possessed much mechanical genius, inventing among other machines one for carving wood.

Au'gurs, a celebrated college of diviners in ancient Rome, who predicted future events and determined the will of the gods from the occurrence of certain signs, connected with thunder and lightning; the flight and cries of birds; the feeding of the sacred chickens; the action of certain quadrupeds or serpents; accidents, such as spilling the salt, etc. The answers of the augurs and the signs were called auguries; bird-predictions were auspices. Nothing was undertaken without the advice of the augurs, and by the words *alto die* ("meet on another day"), they could dissolve the assembly of the people and annul decrees passed at the meeting.

August, ow'güst, the name of many princes of the German principalities: (1) AUGUST WILHELM, prince of Prussia, brother of Frederick the Great, and general in the Prussian army: b. Berlin, 9 Aug. 1722; d. 12 June 1758. He took an active part in the Silesian campaign, and distinguished himself at the battle of Hohenfriedberg (in June 1745), but owing to the fatal retreat of Zittau, in 1756, he incurred the displeasure of his brother, and withdrew from the army. This conflict between the two brothers led to a correspondence, which was published in 1769. (2) AUGUST EMIL LEOPOLD, duke of Saxe-Gotha and Altenburg, successor to the throne,

AUGUST—AUGUSTA

20 April 1804. He was twice married, and the first marriage left him issue, one daughter, who became the reigning duchess of Saxe-Coburg, and died in 1822. By the second marriage he had no children, and on his death he was succeeded on the throne by his brother, Frederick IV., with whose decease, 11 Feb. 1825, the line of Saxe-Gotha became extinct. Duke August Emil Leopold was a favorite of Napoleon, and his duchy enjoyed perfect immunity from the burdens of French invasions and French wars. He was a man of taste and considerable literary talent. (3) **AUGUST FRIEDRICH WILHELM HEINRICH**, prince of Prussia: b. 19 Sept. 1790; d. 19 July 1843, in Bromberg; the son of Prince August Ferdinand, the brother of Frederick the Great, who died in 1813. He was considered one of the richest men in Prussia, and left various children bymorganatic marriages. He took an active part in the campaign against Napoleon in 1806, by whom he was taken prisoner, and detained in Paris until after the peace of Tilsit. On his return to Prussia in 1813, he resumed his duties in the Prussian army, fought at Dresden, Ulm, and Leipsic, distinguished himself during the campaign of 1814, on various occasions, and bore throughout his life the character of a gallant soldier and an upright man. (4) **AUGUST PAUL FRIEDRICH**, grand duke of Oldenburg: b. 1783; d. 27 Feb. 1853; mounted the throne 21 May 1829, under the title of grand duke, which had been conferred upon his family by the Congress of Vienna; but of which his father had never availed himself. When Oldenburg was invaded by the French, in 1811, he accompanied his father to Russia, where his younger brother (b. 1784, d. 1812) was married to the Grand Duchess Catharine. He distinguished himself in the Russian war, and in 1813 was appointed governor of Revel. His reign, after his return to Oldenburg, was marked by political and material progress. In 1830 he concluded a treaty with Prussia for the annexation of Birkenfeld to the Prussian-Hessian Zollverein, and a reciprocal treaty of navigation. In 1836 he prevailed upon Hanover and Brunswick to make satisfactory arrangements for the regulation of excise duties. In 1831 he laid the foundation for a constitution of Oldenburg, which was ratified in 1848, and which, although modified in 1852, still secures much civil and religious freedom to the people. In 1817 he married the Princess Adelaide of Anhalt-Bernburg, who died in 1820, leaving him two daughters, Frederica and Amalie; the latter, in 1830, married King Otho of Greece. In 1825 he married the sister of his first wife, Ida, who died in 1828, having borne him a son. In 1831 he married for the third time, Cecilia, youngest daughter of the former king of Sweden, Gustavus Adolphus IV., who died in 1844, leaving a son. He was succeeded by his first son, Nicholas Frederick Peter, grand duke of Oldenburg.

Au'gust, the eighth month of our year, named by the Roman Emperor Augustus after himself, being associated with several of his victories and other fortunate events. Before this it was called Sextilis or the sixth month (counting from March). July had been named for Julius Cæsar, and the Senate, to gratify Augustus, decreed that August should have equal length, taking a day from February.

Augus'ta, a title first given to his wife Livia, after the death of Augustus, according to the will of the emperor. It was afterward conferred by Claudius on Agrippina (51 A.D.), and by Nero on his wife, Poppæa, as well as her daughter (64 A.D.). Eventually it became a common title of the mother, wife, sister, or daughter of an emperor.

Augusta, ow'gus-ta, **Marie Luise Katharina**, a queen of Prussia, and empress of Germany: b. 1811; d. 1890. She was the daughter of Charles Frederick, grand duke of Saxe-Weimar, and was educated at the Weimar court. In 1829 she married William, then crown prince of Prussia, afterward emperor of Germany.

Augus'ta Victoria, duchess of Schleswig-Holstein-Sonderburg-Augustenburg: b. 22 Oct. 1858. She is the daughter of the late Duke Friedrich; married Prince Friedrich Wilhelm, afterward Wilhelm II., 27 Feb. 1881, and became empress of Germany and queen of Prussia on the accession of her husband to the thrones in June 1888. In 1900 she had borne the emperor seven children, the crown prince, Friedrich Wilhelm, being born 6 May 1882.

Augus'ta, Ga., the third city of the State in population and wealth. It is the capital of Richmond County, and at the head of navigation on the Savannah River, 231 miles by water above its mouth. It is 132 miles by rail from Savannah, 171 miles east of Atlanta, and 137 miles northwest of Charleston. It lies about 150 feet above sea level, has an even temperature and dry, invigorating atmosphere very different from most riverside cities, being indeed a well-known health resort for pulmonary invalids, particularly its suburb Summerville, on the Sand Hills 400 feet above it. It is laid out in broad rectangular streets, many of them beautifully shaded, and with a good electric car service; and has several parks, of which the chief is May Park of about 11 acres. The city hall is in a park containing a granite monument to the Georgia signers of the Declaration of Independence; while on Broad Street, the principal thoroughfare of the city, is a noble monument to the Confederate dead. The cemetery and fair grounds are also suburban attractions.

Manufactures.—The power is chiefly derived from a dam across the river seven miles above the city (enlarged from a smaller one in 1875, at a cost of about \$1,000,000), 150 feet wide at top, 106 at bottom, and 11 feet deep; turning a part of the river into a canal affording 14,000 horse-power, sold to industries at \$5.50 per horse-power per annum, with a working day of 16 hours. Augusta is one of the chief seats of cotton manufacture in the South. Eli Whitney's cotton gin was invented on a farm on the outskirts, and the first working gin was set up in the city. In 1902 there were 13 cotton mills with offices in the city, having a capital of nearly \$6,000,000, operating 329,740 spindles, and 19,360 looms, and employing some 8,000 hands. During 1899, of about \$8,000,000 new capital invested in Georgia cotton manufacturing, fully a third was in Augusta. There are also four large cotton-seed oil mills, and a bleachery. Of other manufactures, the chief are of lumber and wood products, bricks and tile drain pipe from the fine clays in the vicinity, flour, and iron goods. In 1900 there were 388 manufacturing establishments, with \$9,016,619 capital and 7,042 em-

AUGUSTA

ployees; paying \$2,093,915 for wages and \$6,244,286 for materials; and having a total output valued at \$10,069,750. The increase within the past three years, however, has been very large; and it is proposed to utilize the river still more for electric power, the present manufacturing factories practically exhausting the direct water power. The river at Augusta is about five feet deep the year round, and fair-sized passenger and freight steamers make semi-weekly trips to Savannah. Augusta is the largest inland cotton market in the South; and it has also a large shipping trade in lumber, fruit and vegetables. Its annual trade exceeds \$80,000,000, its cotton receipts amounting to 200,000 bales. The water supply is derived from the Savannah River and is unlimited. The city abounds in educational and charitable institutions. Most notable among the former is the Georgia Medical College, a branch of the State University at Athens; there are also Richmond Academy, which has recently been put under the care of the State University; Saint Mary's and Sacred Heart (Roman Catholic) academies, Paine's Institute for Colored Students, and high schools for white and colored youth. There is also a public library of 10,000 volumes. There is an orphan asylum, two public hospitals (white and colored), a juvenile reformatory, and the Louise King Home. A United States arsenal, a Masonic temple, an Odd Fellows' hall, a Chamber of Commerce, and a cotton exchange are also among the notabilities. The city has three daily and several weekly newspapers. The assessed property valuation exceeds \$20,000,000, and the bonded debt in 1900 was \$1,752,300. There are two national and several state banks. Augusta is on the line of many railroads, among them the Central of Georgia, the Charleston & West Carolina, the South Carolina & Georgia, the Southern, etc. Its original charter was obtained in 1798, and revised 1882; the mayor is elected for three years, and a city council, consisting of 15 members, is also elected for three years, one third being elected each year. The board of education is elected by the people. All other offices are appointive by the council, save that the mayor appoints the superintendent of canal and waterworks, and of streets and drains.

Population—In 1800, 2,215; (1840) 6,403; (1852) 10,217; (1860) 12,493; (1870) 15,389; (1880) 21,891; (1890) 33,300; (1900) 39,441. It suffers on the census returns, however, from having suburbs, North Augusta, across the river in South Carolina; Summerville, and others not counted in; and claims about 60,000 at present.

History—Augusta was founded in 1736 by Gen. James Edward Oglethorpe (q.v.), the founder of Georgia, and named after the Princess Augusta of Saxony, who married Frederick, Prince of Wales, in that year, and became the mother of George III. All through its early period it was the chief trading station in Georgia, and a very important military post; especially notable as the seat of conferences and treaties with the southern Indians, who under the treaties of 1763 and 1773 ceded large tracts of land to the whites; the latter, however, had to occupy much of it at the same risk of Indian warfare as before. In 1778 it was made the State capital, and remained such till

1798. The building of the Georgia railroad in the middle of the 19th century was a heavy blow to its prosperity for a time, carrying trade over new routes; but its natural advantages enabled it to recover itself.

THOS. W. LOYLESS,
Editor 'The Augusta Chronicle.'

Augusta, Maine, city county-seat of Kennebec County and capital of the State; on the Kennebec River, 40 miles above its mouth, at the head of tidal navigation, and on the Maine Central R.R., 63 miles northeast of Portland. It is situated on both sides of the Kennebec, mainly on the right or west bank, and some portion of it, including much of the residential section, occupies an elevation considerably above the river, along which the principal business part of the city extends. The Augusta, Winthrop and Gardiner electric railway connects the city with neighboring places, and its water communications afford excellent facilities for travel and trade.

Public Buildings and Institutions.—The State Capitol is a handsome granite building, for which the stone was quarried from the surrounding hills. It stands on high ground overlooking a wide extent of pleasant country. Among other noteworthy buildings are those of the Maine Insane Hospital, the City Hospital, the public library, the county buildings, and the United States arsenal. The churches include those of the Congregationalists, Episcopalians, Free Baptists, Colonist Baptists, Christians, Universalists, Unitarians, Methodists, Roman Catholics, and the People's Church. The public schools include all grades from the primary to the high school. In the capitol are the State library, a notable collection of portraits of American statesmen, and, in the rotunda, an impressive array of the Civil War battle flags of Maine soldiers. In the principal park is a soldiers and sailors' monument.

Industries.—Augusta, by reason of its railroad and river facilities, is the trade centre of a large region, and the water-power furnished by the Kennebec, across which, just above the city, extends a dam nearly 1,000 feet in length, affords abundant means for manufacturing. The cotton factories here employ about 1,100 persons; shoe manufacture, 300; pulp mill, 250; lumber mill, 100; sash and blind factory, 75; and besides various smaller establishments the city has publishing houses in which some 400 persons are employed.

Banks, etc.—There are two national banks in the city, with a combined capital of \$350,000, a trust company having a capital of \$100,000, and two savings banks. The deposits of these institutions aggregate \$11,000,000.

Municipal Government.—The city is governed by a mayor and a city council, a body consisting of boards of aldermen and common council, elected by the people.

History.—Augusta was first permanently settled in 1754 by colonists from Massachusetts; was incorporated under the name of Hollowell in 1771; and upon the setting off of Hollowell in 1797 became a separate town. In 1831 it became the capital of the State, and has been the scene of many important political events. It received a city charter in 1849. Its population in 1900 was 11,683; in 1903 it was estimated at 12,031. The employees of the cotton factories

AUGUSTA—AUGUSTINE

are mostly French Canadians, the other inhabitants chiefly natives. Consult: North, 'History of Augusta' (1870). **FRED'K W. PLAISTED,**
Editor 'The New Age.'

Augus'ta, the name of many ancient European towns, as Augusta Trevirorum, now *Treves*; Augusta Taurinorum, now *Turin*; Augusta Vindelicorum, now *Augsburg*, etc.

Augus'ta, a city of Sicily. See **AGOSTA**.

Augus'ta His'toria, a series of Roman biographies of the emperors from the accession of Hadrian to the death of Carinus, the predecessor of Diocletian a period covering 167 years. The writers included in this collection are six in number, namely, Ælius Spartianus, Julius Capitolinus, Ælius Lampridius, Valsatius Gallicanus, Trebellius Pollio, and Flavius Vopiscus, of Syracuse.

Augus'tan Age, the Latin literary epoch of the reign of the emperor Augustus Cæsar. During this period Horace, Ovid, Virgil, Tibullus, and other writers flourished; also great patrons of literature like Mæcenæ. The purest Latinity belongs to the authors of the Augustan age. The name is applied in England to the reign of Queen Anne (1702-14). By far the foremost name is that of Sir Isaac Newton, and of commanders, John Churchill (Duke of Marlborough). The poets were Congreve, Garth, Gay, Parnell, Philips, Pope, Prior, Rowe, and Swift. The other authors were Addison, Barnes, George Bull, Anthony Collins, Jeremy Collier, Roger Cotes, Defoe, Dodwell, Flammesteed, George Hickes, Dr. John Jeffery, John Norris, Ray, South, Steele, etc. Wren, Archibald Pitcairn, and Sir Cloudesley Shovel also lived in this reign.

Au'gusta'na Col'lege, a co-educational institution in Rock Island, Ill., organized in 1860 under the auspices of the Lutheran Church; reported in 1902: Professors, 31; students, 250; volumes in the library, 18,000; ground and buildings valued at \$166,000; productive funds, \$225,000; income, \$32,119; graduates, 881.

Au'gustine, Saint (AURELIUS AUGUSTINUS), one of the most renowned fathers of the Christian Church: b. Tagaste, in Numidia, 13 Nov. 354; d. Hippo, 28 Aug. 430. His father, Patricius, was a pagan, his mother, Monica, a Christian. He has related his own early life in the work to which he gave the title of 'Confessions.' His mother instructed him in Christianity, but for many years this faith had little influence on his life. He was long devoted to pleasure, and when quite young became father of a son by a woman with whom he was not connected by marriage. He was intended for the profession of rhetorician, and was sent to Carthage to study with this object in view. Cicero's work, 'Hortensius,' which has not come down to our times, first led him to speculative studies, and he now became a member of the sect of the Manichæans. He was one of their disciples for nine years; but after having obtained a full knowledge of their doctrine, he found it unsatisfactory and left them. In 383 he left Africa for Rome, and after a short stay there proceeded to Milan, where he was invited as a teacher of rhetoric. St. Ambrose was bishop of this city, and his eloquent discourses, combined with the study of the Scriptures, converted Augustine to the orthodox faith, and wrought an entire change in his life

and character. His conversion appears to have taken place in 386. He now retired into solitude, and prepared himself for baptism, which he received in the 33d year of his life, together with his son Adeodatus, from the hands of Ambrose, his mother being then with him. Returning to Africa, he sold his estate, and gave the proceeds to the poor, retaining only enough to support him in a moderate manner. For three years he lived a retired life, devoting himself to religious duties, and to the composition of several treatises. Chancing on one occasion to be present in the church at Hippo, the bishop, who was a very old man, signified a desire to consecrate a priest to assist and succeed him. At the desire of the people Augustine entered upon the holy office, preached with extraordinary success, and in a few years became Bishop of Hippo. The remainder of his life was occupied with his ecclesiastical labors, and with various controversies in which he warmly engaged, such as those with the Donatists, the Manichæans, and more especially the Pelagians, concerning the doctrines of free-will, grace, and predestination. Augustine maintained the necessity of divine grace in determining man's moral acts to salvation, and he supported the doctrine of predestination, including election and reprobation, but always allowing for free-will and for the merit of the individual. His authority has always been very influential in the Roman Catholic Church, and his view upon any doctrinal matter has at all times carried great weight and is constantly cited in controverted questions. He died at Hippo, while the town was besieged by the Vandals. There have been more learned fathers of the Church, but none have ever more powerfully touched the human heart, and warmed it toward religion. Painters have, therefore, given him for a symbol a flaming heart. His writings (which are in Latin) are very numerous. The most celebrated are his 'Confessions' (belonging to the year 397), his 'De Civitate Dei' (On the City of God), a work on the Christian Church, his treatise on the Trinity, 'Christian Doctrine'; 'Nature and Grace'; 'Grace and Free-Will'; 'Immortality of the Soul,' and his 'Letters.' His works have been published at Paris in 22 volumes, and an English translation in 15 volumes has appeared at Edinburgh, edited by Dr. Marcus Dods. See Neander, 'Church History'; Milman, 'Latin Christianity'; Farrar, 'Lives of the Fathers,' etc. Two monastic bodies, the *Augustinian Canons*, or *Black Canons*, and the *Augustinian Hermits* (q.v.), claimed to derive their origin from St. Augustine. Life by Hatzfeld.

Au'gustine, or Austin, Saint, the first archbishop of Canterbury: d. 26 May 604. While prior of the Benedictine monastery of Saint Andrew at Rome he was selected by Pope Gregory I., together with 40 other monks, to convert the Anglo-Saxons to Christianity, and establish the authority of the Roman See in Britain. In the spring of 597 the missionaries landed on the Island of Thanet and were kindly received by Ethelbert, king of Kent, whose wife Bertha was already a Christian. The conversion of the king speedily followed, contributing greatly to the success of Augustine's work, large numbers of persons were converted and baptized, and it was soon manifest that a new influence for good had come into the lives of

AUGUSTINIANISM

the Anglo-Saxons. In acknowledgment of his success, the Pope directed Augustine in 597 to go to Arles, where he was consecrated archbishop of Canterbury and metropolitan of England. On his return he at once informed the Pope of his success, sending a presbyter and a monk to Rome for that purpose and also to obtain instructions concerning other questions with regard to the propagating of the faith. The answer of Gregory to the archbishop's inquiries are fine examples of tact, good sense and judgment in dealing with the problems confronting the early missionaries, and instead of destroying the heathen temples they were converted into Christian churches. Saint Augustine was a zealous missionary of the Church and labored with untiring energy to extend the authority of the Church and to convert the ancient Britons, whom the English had driven into the mountains of Wales. In this, however, he was only partially successful, some of the British bishops refusing to acknowledge his authority and to unite with the English Church. Augustine died in Canterbury, and eight years afterward his body was removed to the Cathedral of Canterbury. Consult: Bede, 'Historia Ecclesiastica Gentis Anglorum'. Mason, 'The Mission of Saint Augustine to England' (1897).

Augustinianism, the system of philosophy and theology taught by Saint Augustine. In order to reach a just estimate of the teachings of Augustine, we must remember that we are not dealing with a philosopher simply, or with a theologian simply, but with one whose nature combined in a marked degree, the philosophical and theological strains together. He was both philosopher and theologian. These elements are so mixed in him at times as to reciprocally reinforce one another, but again so disparate as to cause irreconcilable inconsistencies and bold contradictions. There is a most excellent analysis of this exceedingly complex nature by Teuffel in his 'History of Roman Literature,' remarkable alike for its comprehensiveness and brevity. "Augustine combined in his character qualities seemingly opposite: an abundant imagination, and penetrating intellectual vigor, a passionate want of regard and affectionate tenderness, a tender heart and zealotism, a blind belief in superior authority and originality of thought, zeal for unity of the Church and individual piety, romanticism and scholasticism, mysticism and sophistry, poetical talent and philosophical genius, rhetorical pathos and grammatical pedantry, — himself a psychological mystery." With this portrait of his personality before us, let us examine his teachings. For him, the source of all truth is to be found in the interpretation of the inner experience. His philosophy is primarily anthropocentric. In consciousness lies the assurance of the reality of one's own being. This is the earnest and the warrant of all reality. Without this central and elemental knowledge all other knowledge would be vague, and illusory. This assurance is given even in the very act of questioning it; for, as Augustine insists, the simple fact that I am conscious of doubting even the doubting of my own reality, is in itself an indication that I the doubter am. Man cannot escape himself. Such an analysis of the implications of self-consciousness forms a striking anticipation of Descartes' famous *Cogito ergo sum*.

With the reality of human personality firmly established upon a basis which even the most searching skepticism is unable to shake, but on the contrary the rather confirms, Augustine proceeds through a profound analysis of the human reason to disclose abundant intimations of a divine reason, and therefore of a divine being. For in his subtle examination of the processes of reason, he points out that these processes are ever working toward one and the same end, — the constructing of a body of knowledge consisting of truths universally valid, that is, truths which hold not merely for the individual but which necessarily hold for all individuals, under all circumstances and at all times. They become moreover, the norm or standard for all our thinking and their sway embraces the complete range of all human activity. These truths are so universal, so complete, so commanding as to indicate a oneness of origin which can be nothing less than that of an eternal mind. Moreover, the eternal mind must be an eternal personality. The universal truths, therefore, which lie at the basis of all thought, of all being, of all desire, and all activity are according to Augustine ideas in God. In regarding the Absolute as not merely the sum total and unification of all truth, the *unum, verum bonum*, but also a living personality, the divine Logos, we recognize the marks of the religious teacher, and in this respect Augustinianism is to be regarded as a significant advance beyond the doctrines of Neo-Platonism. From this exposition, it should not be inferred, however, that in the Augustinian psychology, the primary, or the sole basis of our conscious life is knowledge. On the contrary it is quite evident throughout the works of Augustine that he exalts the will above knowledge. He finds in consciousness three elements, *memoria, intellectus, voluntas*. Of these *memoria* is equivalent to a reproducible idea (*Vorstellung*), an idea which, moreover, carries with it the warrant of the reality which underlies it as its ground; *intellectus* is the judgment; and *voluntas* of course, the will. The three form a psychological trinity corresponding to the trinity which is manifested in the unity of the divine nature. Both in God and man, the will is supreme. *Omnes nihil aliud quam voluntates sunt*.

Certain difficulties emerge at this point in the exposition of the Augustinian system owing to the shifting of the point of view. The philosopher gives way to the theologian. Augustine's philosophy is essentially anthropocentric; his theology, theocentric. And in discussing the relations which obtain between God and man Augustine naturally subordinates the human to the divine, so much so indeed that the Augustinian system is severely criticised because, as it is alleged, it leads logically to a pantheism which wipes out the individuality and responsibility of man. For Augustine insists that to appreciate divine truth and the will of God for man there is need of an inner spiritual illumination, and that such an illumination comes only to the soul in which faith resides, and that faith is the gift of divine grace. Faith, therefore, must precede knowledge, that is, knowledge of things divine and knowledge of things as they are. Insight may be regarded as the fruitage, but faith is the root of knowledge. There is a grave difficulty at this point in reconciling such a doctrine with Augustine's fundamental posi-

AUGUSTINIANS

tion which puts supreme emphasis upon the dignity and worth of man's inner nature, and the trustworthiness of that inner guiding light. It can only be said by way of explanation that in the one the theologian, and in the other, the philosopher, speaks.

Moreover, in this view of the human consciousness the primacy of the will is in a large measure denied by the insistence that man is wholly dependent upon divine grace in order to exercise his will aright. He alone is free, says Augustine, whose will has been touched by the divine will, and whose desires and activities are found wholly in accord with the will of God. The natural man is not free unless emancipated by divine grace; for Adam, the representative of humanity, the federal head of the race, abused his natural freedom of will and in his fall has left as an inheritance to the race the tendency to sin. And the most significant consequence of sin is the bondage of the will, which divine grace alone can overcome. Augustine, therefore, seems to solve the problem of free will and predestination by denying to man a real freedom. He indulges in many subtle distinctions as to the various kinds of grace. There is, for instance, the prevenient grace, also the supporting grace, active grace, and grace bestowing the gift of perseverance which seals all previous effects. No distinction, however, is drawn which relieves the system from the criticism already mentioned of minimizing the autonomy of the human will.

This position of Augustine naturally raises the question as to how the evil in the world can be reconciled with the idea of divine power and divine goodness. For if God alone is free, He alone is responsible; and man should not be held accountable for that which he unaided is unable to prevent. Such a criticism Augustine meets by the statement that the evil in the world is after all not a real evil; it is not a *causa efficiens*, but merely a *causa deficiens*, in fact only an *incausale*. Such an explanation, however, is not satisfactory and does not squarely meet the difficulty of the problem which the common experience of humanity all too unhappily emphasizes.

Augustine's type of mind is essentially that of a great systematizer of doctrine. He could rest content with no form of knowledge unless it could be reduced to a *schema* in which part fitted to part in an exact and inflexible manner. Augustine's system has been criticised for this very reason that its lines are hard and fast, yielding at no point the full rigor of its inexorable doctrines. But while in a certain sense such a criticism is justified, there was, in addition to this pronounced synoptical tendency of thought, an equally profound strain of sentiment and feeling. Augustine was essentially human, and wont to be moved by the passions and aspirations common to man. Within the very body of this system of doctrine, and its closely concatenated dogmas, it is possible to discover a deep underlying current of mysticism, which may be traced no doubt to its source in Neo-Platonism,—a mysticism manifesting itself in that compulsion of the soul, to long for communion with God, and to behold Him face to face. It is this intensely human strain, this mystical element, which relieves the Augustinian system as a system from its more severe and sombre features. The great system builder after all subordinates the system to that which is the ground of the

system. Not in the processes of reason, but in a direct and immediate consciousness of God, does he find the ultimate certitude. Nothing can more beautifully or more adequately express this mystical strain in Augustine's nature than those words which embody both a philosophy and a creed: "Thou hast made me for thyself and my heart is restless until it finds rest in thee."

Bibliography—Heurt, 'Problems of the Age With Studies in Saint Augustine on Kindred Topics' (1903); McCabe, 'Saint Augustine and His Age' (1903); Schaff, 'Saint Augustine, Library of the Nicene and Post-Nicene Fathers,' Vol. I, pp. 1-25; Donier, 'Augustinus' (Berlin 1872); Neurisson, 'La Philosophie de Sainte Augustine' (Paris 1866).

JOHN GRIER HIBBEN,
Professor of Philosophy, Princeton University
Augu'stin'ians, hermits of St. Augustine (calced), brotherhood of churchmen, devoted to the spread throughout Christendom of the principles of the higher life, of religion as well as earthly science, and searchers, too, after peace of the spirit, established in the 4th century, at Tagaste in Africa, by the famed St. Augustine, later Bishop of Hippo and illustrious doctor of the Church. Up to the 13th century Augustinians were engaged mainly in the practices of ascetic life, a course of seclusion, or retirement, from the bustle and troubles of worldly affairs in trade, politics, commerce. As hermits, at first they lived, some alone in their cells in out-of-the-way places in forest and mountain, others in community-groups outside of towns. Here their life was passed in quiet, in contemplation, study, prayer, copying MSS, and manual toil, as farm, and garden-work, reclaiming waste lands, digging canals for irrigation and drainage. Eminent among them in this peaceful era were two reformers of their brotherhood, famed in hagiography, who by centralizing the energies of their followers on set lines of work, sought to render their societies more potent factors for the common good, as adepts in intellectual, artistic, and more industrial spheres. William IX., duke of Aquitaine, an old-time leader in the crusades, now a dweller in a monastery of the Tuscan hills, and John Bonus, The Good, of Mantua, a one-time strolling player by profession, now penitent, who by their wonderful powers of nature and grace employed in the service of their respective communities, reached high rank in the world of saintly heroism in southern Europe, in France, and Italy, then in the north, in Germany and England, wherein were founded congregations under their rule. Spreading thence throughout the various quarters of Christendom, especially in western Europe, their followers settled in Spain, Portugal, Belgium, and Ireland, where they established houses of their brotherhood in the principal cities and towns of the civilized world. In 1256, in pursuance of the designs of his predecessors in the papal chair, Alexander IV. moved to ensure the complete union of all the different congregations of Augustinians in Europe, succeeded finally in merging their several branch orders into one body politic and social under the leadership of Lanfranc Septala, of noble Milanese birth, the first superior general of the Augustinian Hermits, chosen thereto in the first general chapter of the brethren at Rome in the above year. Nor were the successors of Alex-

AUGUSTULUS—AUGUSTUS

ander slow in their recognition of the powers of this new association. To them were entrusted several places of honor in the pontifical court, among them the offices of apostolic confessor, of librarian, papal sacristan, the latter subsequently declared by Sixtus IV. as of perpetual right of the Augustinians. Not long after they were entrusted with the collection of papal revenues in many countries, and even charged by some of the republics of Italy with the handling of state funds.

In the Middle Ages as in later days many of this brotherhood won fame in the higher realms of life, by their gifts of spirit in science and art, as saints, writers, masters in theology, Scripture-study, philosophy, history, law, antiquities, letters and poetry. Celebrated as teachers in schools of their order as well as outside were such masters as Egidius Colonna of Rome, known as the "Fundamental Doctor"; then Augustine of Ancona, who won renown in scholastic theology; John Capgrave in history; Onuphrius Panvinio in antiquities; Luis de Leon in theology and poetry; John Laurence Berti in history; John Baptist Cotta in poetry, John Michael Cavalieri in liturgy, and lately Augustine Ciasca in Oriental languages. Eminent for their supernatural gifts, many of the most singular character, were Nicholas of Tolentine, "wonder-worker of the Church," so styled by Pope Eugene IV.; Clare of Montefalco, the stigmatized, in whose heart were discovered the insignia of Christ's passion; Rita of Cascia, ecstatic, known as "the saint of the impossible"; Thomas of Villanova, almsgiver of Spain, and John de Schagun, reformer of the clergy of that country. They are of prominence from the 16th century especially in various mission fields in Mahometan and heathen countries; in Asia, in China, India, Persia, Japan, and the Philippines; in Africa, in Zanzibar, Mozambique, and the Guineas; then in America, both north and south, and Australia. In later times during the closing years of the 18th century, was established the first English-speaking branch of the Augustinians in the United States, where, in 1796, a house of that brotherhood was opened in Philadelphia, by two members of Irish blood,—Dr. Matthew Carr and John Rosseter,—the latter said to have been formerly an officer under Rochambeau. They are the calced communities. Here their aim chiefly has been mission work among the faithful in pulpit and school. Offshoots from Philadelphia, now thriving in the United States as well as in Cuba and the Philippines are some 20 convents and houses of the order, as mission-centres, with 113 members in residence or in study-houses in Europe. Seventy-five are priests, actively engaged in two colleges, one of them in Havana, 1 academy, 10 parish-schools, besides the congregations of 29 parishes. Furthermore attached to every central establishment the Augustinians have charge of various guilds, or societies, devoted to such aims as religion, social improvement, beneficence in the promotion of good works in the several fields of charity, patriotism, letters, and science.

THOMAS C. MIDDLETON, O. S. A.

Augus'tulus, Romulus, the son of Orestes, a general of the Roman emperor Julius Nepos. Orestes deposed the emperor, and placed his son upon the throne, in 475. In the following year Odoacer, a commander of the German forces in

the Roman service, revolted, put Orestes to death, obliged Augustulus to resign, and thus put an end to the Roman empire in the West. The emperor's name was originally Romulus Augustus, but the Romans changed the latter into the diminutive form Augustulus, out of contempt for his character.

Augus'tus, Caius Julius Cæsar Octavianus, originally called CAIUS OCTAVIUS, the celebrated Roman emperor: b. 23 Sept. 63 B.C.; d. Nola, 19 Aug. 14 A.D. He was the son of Caius Octavius and Atia, a daughter of Julia, the sister of Julius Cæsar. The Octavian family originated at Velitræ, in the country of the Volscians. The father of Octavius had risen to the rank of senator, and had gone to Macedonia, after being chosen prætor, where he was a civil and military officer. Octavius lost his father when young, but was carefully brought up by his mother and L. Marcius Philippus, the second husband of Atia. His talents gained him the regard of his great-uncle, Julius Cæsar, who declared himself willing to adopt him for his son, in case he himself should remain without children. Octavius was studying under the renowned orator Apollodorus, when he received the news of the tragical death of his uncle, and of his having adopted him as his son. Notwithstanding the anxiety of his friends, he went to Italy, and on landing at Brundisium, deputies from the veterans collected there came to him. Conducted in triumph to the city, and saluted as the heir and avenger of Cæsar, he made his adoption publicly known, and took the name of his uncle, adding to it that of Octavianus. He then advanced to Rome, where there were now two parties, that of the republicans, who had killed Cæsar, and that of Antony and Lepidus, who, under the pretense of avenging him, strove to establish their own authority. Octavianus addressed himself first to Cicero, at Cumæ, being desirous to gain over this great orator, and from thence he went to Rome, where the greater part of the magistrates, soldiers, and citizens came to meet him, Antony alone paying no attention to his return. After Octavianus had caused his adoption to be confirmed in the most solemn manner, he went to Antony, and demanded of him the inheritance left him, in order to pay the legacies mentioned in his uncle's will. Antony at first haughtily refused to acknowledge his claims, but changed his attitude when he found the influence of Octavianus continually increasing, and his own proportionably diminishing. There could be no real union, however, between two equally ambitious rivals. In their hearts they cherished reciprocal hatred and jealousy; and their enmity was so little a secret that Octavianus was accused of having wished to get Antony murdered. He afterward, when Antony, together with Lepidus, entered Italy at the head of a powerful army, united with him, and a triumvirate was formed by the three generals, who defeated the republican army under Brutus and Cassius, at Philippi in Macedonia (42 B.C.). After his return to Rome he satisfied the demands of his soldiers by dividing among them confiscated lands. This division caused great disturbances. In the midst of the stormy scenes which convulsed Italy, he was obliged to contend with Fulvia, whose daughter, Clodia, he had rejected, and with Lucius, the brother-in-law of

AUGUSTUS

Antony. After several battles, Lucius threw himself into the city of Perugia, where he was soon after obliged to surrender. The city was given up to be plundered, and 300 senators were condemned to death. After the return of Antony, an end was put to the proscriptions. Octavianus allowed such of the proscribed persons as had escaped death by flight, and whom he no longer feared, to return. There were still some disturbances in Gaul, and the naval war with Sextus Pompeius continued for several years. By a skilful course of conduct he brought about the defeat of Pompeius and reduced Lepidus to a nullity, thus leaving Antony alone as his rival. The empire was now divided between him and Antony; but while the former, in the East, gave himself up to a life of luxury, the young Octavianus pursued his plan of making himself sole master of the world. He especially strove to obtain the love of the people. He displayed mildness and magnanimity, without the appearance of striving after the highest power, and declared himself ready to lay down his power when Antony should return from the war against the Parthians. He appeared rather to permit than to wish himself to be appointed perpetual tribune—an office which gave him supreme power. The more he advanced in the affections of the people, the more openly did he declare himself against Antony.

By making public a will, wherein his rival appointed his sons by Cleopatra his heirs, he stirred up the ill-will of the Romans against him. Availing himself of this feeling, Octavianus declared war against the queen of Egypt, and led a considerable force, both by sea and land, to the Ambracian Gulf. Here his admiral Vip-sanius Agrippa gained the naval victory of Actium (q.v.), which made Octavianus master of the world, 31 B.C. He pursued his rival to Egypt, and ended the war, after rejecting the proposal of Antony to decide their differences by a personal combat. Cleopatra and Antony having killed themselves, Octavianus caused them to be buried with imposing ceremonies. A son of Antony and Fulvia was sacrificed to ensure his safety, and Cæsarion, a son of Cæsar and Cleopatra, shared the same fate. All the other relations of Antony remained uninjured, and Octavianus, on the whole, used his power with moderation. He spent two years in the East, in order to arrange the affairs of Egypt, Greece, Syria, Asia Minor, and the islands. On his return to Rome he celebrated a triumph for three days in succession, and (29 B.C.) closed the temple of Janus—for the third time since the foundation of Rome. Freed from his rivals and enemies, and master of the world, he is said to have been undecided as to how he should exercise his power, or whether he should even retain it. He first set about correcting the abuses which had prevailed during the civil war, established a general peace, ejected unworthy members from the Senate, restored ruined temples, and built new ones.

At the end of his seventh consulship, he entered the Senate house, and declared his resolution to lay down his power. The Senate, astonished at his moderation, besought him to retain it. He yielded to their pressing entreaties, and continued to govern through them. He now obtained the surname of Augustus, which marked the dignity of his person and rank, and united, by degrees, in himself, the offices of imperator,

or commander-in-chief by sea and land, with power to make war and peace; of proconsul over all the provinces; of perpetual tribune of the people, which rendered his person inviolable, and gave him the power of interrupting public proceedings; and, in fine, of censor, and pontifex maximus, or controller of all religious matters. The laws themselves were subject to him, and the observance of them depended upon his will. It was the spirit of his policy to retain old names and forms, but he steadfastly refused to assume the title of dictator, which latterly had become especially odious. He conducted many wars in Africa, Asia, and particularly in Gaul and Spain, where he triumphed over the Cantabrians after a severe struggle. His arms subjected Aquitania, Pannonia, Dalmatia, and Illyria, and held the Dacians, Numidians, and Ethiopians in check. He concluded a treaty with the Parthians, by which they gave up Armenia, and restored the eagles taken from Crassus and Antony. At the foot of the Alps he erected monuments of his triumphs over the mountaineers, the proud remains of which are yet to be seen at Susa and Aosta. After he had established peace throughout the empire, he again closed the temple of Janus. But this peace was interrupted, 9 A.D., by the defeat of Varus, who lost three legions in an engagement with the Germans, under Arminius, and killed himself in despair. The information of this misfortune greatly agitated Augustus. He let his beard and hair grow, and often cried out in the deepest grief, "O Varus, restore me my legions!" Meanwhile the Germans were held in check by Tiberius. During the peace, Augustus had issued many useful decrees, and abolished abuses in the government. He gave a new form to the Senate, employed himself in improving the manners of the people, particularly by promoting marriage, enacted laws for the suppression of luxury, introduced discipline into the armies, and order into the games of the circus. He adorned Rome in such a manner that it was truly said, "He found it of brick, and left it of marble." He made journeys, as Velleius says, everywhere, to increase the blessings of peace; he went to Sicily and Greece, Asia Minor, Syria, Gaul, etc.; in several places he founded cities and colonies. The people erected altars to him, and, by a decree of the Senate, the month Sextilis was called August. The debauchery of his daughter Julia gave him great pain, and he showed himself more severe against those who destroyed the honor of his family, than against those who threatened his life. History says that, in his old age, he was ruled by his wife Livia, the only person, perhaps, whom he truly loved. He had no sons, and lost by death his sister's son, Marcellus, and his daughter's sons, Caius and Lucius, whom he had appointed his successors. Also, Drusus, his son-in-law, whom he loved, died early; and Tiberius, the brother of the latter, whom he hated, on account of his bad qualities, alone survived.

These numerous calamities, together with his continually increasing infirmities, gave him a strong desire of repose. He undertook a journey to Campania, from whose purer air he hoped for relief; but disease fixed upon him, and he died, in the 79th year of his age, and 45th of his reign. When he felt his death approaching he is said to have called for a mirror, arranged his hair, and demanded of the by-standers,

AUGUSTUS—AUK

"Have I played my part well?" and, an answer being returned in the affirmative, "Then," added he, using the form of the players, "farewell, and applaud" (*valet, et plaudite*). If this last passage in the life of Augustus is true, it is certainly indicative of his character, his policy, and even of his fortune. He conquered Brutus by means of Antony, and Antony by means of Agrippa. He several times changed his party, but never his purposes, and knew how to cause power to be offered, and pressed upon him, while it was, in fact, the object of all his exertions. It cannot be denied that he used his power with wisdom, and became the benefactor of his country, which he had previously plunged into the horrors of civil war. His taste and active mind led him to favor and protect the learned; and he even exercised the art of the poet himself; so that he was not unworthy of giving his name to an age distinguished for intellectual creations. His death plunged the empire into the greatest grief. He was numbered among the gods, and temples and altars were erected to him. See Gardthausen, 'Augustus und seine Zeit' (1891); Schuckburg, 'Augustus' (1903).

Augustus I., elector of Saxony: b. 1526; d. 1586. During a peaceful reign, he greatly beautified Dresden, his capital, and built the palace of Augustenburg.

Augustus II., Frederick, elector of Saxony and king of Poland, second son of John George III., elector of Saxony: b. Dresden, 1670; d. 1 Feb. 1733. He was noted for his activity. In 1695 he became elector and in 1696 was candidate for the vacant Polish throne. The French ambassador and the nobles supported the Prince of Conti, but Augustus by acceptance of the Roman Catholic faith, by bribery and intimidation secured the election, 27 June 1697. Early in his reign, a treaty was made between Denmark, Poland, and Russia against Charles XII. of Sweden, for the conquest of Livonia. But Charles, after having defeated the Danes and the Russians, turned toward Poland. Thus began the celebrated Northern war, which lasted 20 years. Charles gained a complete victory, 20 July 1702, and on 1 May 1703, the Saxon army was defeated again at Pultusk. The diet assembled at Warsaw declared Augustus, 14 Feb. 1704, incapable of wearing the crown of Poland, and Stanislaus Lesczinsky, waywode of Posen, was chosen king, 12 July 1704. Charles, victorious on every side, advanced into Saxony, and Augustus found himself obliged to negotiate a secret peace, at Altranstadt, 24 Sept. 1706.

He now devoted himself to the domestic affairs of Saxony. His love of splendor involved him in many expenses, by which the finances of his kingdom were disordered. In 1709, after the defeat of Charles at Pultawa, the Poles recalled Augustus, who united himself anew with Peter the Great. A confederation was now formed in Poland against the Saxon troops, by the party of Stanislaus, in the belief that Augustus was aiming at absolute power. The Saxons were attacked and obliged to surrender. At length, through the mediation of Peter, an arrangement was concluded at Warsaw, 1717, between Augustus and the Polish leaders. The Saxon troops were removed from the kingdom, and Augustus agreed not to maintain more than

17,000 soldiers in Poland, who were to be under the Polish authorities. The last years of his reign were characterized by boundless luxury and corruption of manners. He was not disliked by his subjects, and filled with dignity his station among the European powers. In his character generous ideas were united with despotic feelings, a taste for pleasure with the cares of ambition, and the restlessness of a warlike spirit with the effeminacy of a luxurious life. By his mistresses he had many children. The Countess of Konigsmark bore him the celebrated Maurice of Saxony.

Augustus III., Frederick, elector of Saxony and king of Poland, son of Augustus II: b. Dresden, 1696; d. there 5 Oct. 1763. He succeeded his father as elector in 1733. A part of the Polish nobility chose Augustus king; and in 1736 he was first generally recognized as such by the congress assembled at Warsaw to conclude a peace. Although without the great and amiable qualities of his father, in other respects he closely followed his example, distinguishing himself by the splendor of his feasts and the extravagance of his court. His system of politics consisted in entire dependence upon Russia. He preferred Dresden to Warsaw, and through his long absence from Poland the government sank into entire inactivity. When Frederick attacked Saxony itself in 1745, Augustus deserted his capital, and preserved his pictures and porcelain, but lost the archives of the state, which fell into the hands of the victors. By the peace of Dresden, 25 Dec. 1745, he was reinstated in the possession of Saxony, in the next year. In 1756 he saw himself involved anew in a war against Prussia, and fled to Konigstein, and afterward to Poland. His authority in this country had always been inconsiderable, and after the loss of Saxony, became still more insignificant. The accession of Catherine to the Russian throne was a source of disquietude, for she sought to deprive the Saxon princes, who were allies of France, of the Polish thrones. The Peace of Hubertsberg was hardly concluded when Augustus returned from Warsaw to Dresden, where he died. His son, Frederick Christian, succeeded him as elector of Saxony, and Stanislaus Poniatowsky as king of Poland.

Auk, *āk*, a diving sea-fowl of the family *Alcida* found in the northern regions, the term covering guillemots, murre, lomvias, puffins, and others. They are thick-set birds, seldom more than a foot long, which move about with difficulty on land, from the fact that their legs are set very far back, giving them an erect, penguin-like attitude. In color they are dark brown, black, or lead-color above, and white beneath, except in the breeding season, when bright colors and ornamental plumes temporarily appear on the males of some species. The wing-feathers are so short as to be of little service for flight, and the wings are more used as aids in swimming under water, where they pursue fishes with great speed. The bill is much compressed, but in the breeding season, among the puffins, which show the most marked compression of bill at other times, the bills increase in size and develop ornamental appendages which disappear as the moulting season comes on. The most important North Atlantic auks are the now-extinct great auk (*plautus impennis*) which was as large as a goose and within historic times abounded as far south as the Hebrides

AULD LANG SYNE—AUMONT

(see GAREFOWL); the little auk (*Alle alle*), not larger than a robin and very abundant, sometimes in winter coming as far south as New York and the Great Lakes (see DOVEKIE); and the razor-billed auk (*Alca torda*), which has a bill of remarkable length and sharpness, and which breeds even as far south as the Maine coast. (See MURRELET; PUFFIN, RAZOR-BILL.) The auk lays only a single large egg, which, as no nest is prepared, the parents care for by holding upon the top of their webbed feet and between their thighs. These eggs are a staple food for the natives of the arctic regions, as are the birds, also. They are taken in summer and preserved for winter use, as in the autumn the auks migrate from the frozen coasts and spend the winter in the open spaces of the sea. Consult American and British ornithologies; and Selous, 'Bird Watching' (1901).

Auld Lang Syne, áld lang sin, a song attributed to Burns, who added a couple of stanzas to a poem known to have existed in 1600.

Auld Licht Idylls, áld licht i'dills, a work by James M. Barrie. It is a series of 12 sketches of life in Glen Quharity and Thrums. In all of them the same characters appear.

Auld Ree'kie. See EDINBURGH.

Auld Rob'in Gray, a famous Scottish ballad by Lady Anne Barnard, published anonymously in 1722, but unacknowledged till 1825.

Aulic (Latin, *aula*, a court or hall), a term applied to a council (the *Reichshofrath*) in the old German empire. It was one of the two supreme courts of the German empire, the other being the court of the imperial chamber (*Reichskammergericht*). It had not only concurrent jurisdiction with the latter court, but in many cases exclusive jurisdiction, in all feudal processes, and in criminal affairs, over the immediate feudatories of the emperor and in affairs which concerned the imperial government. The title is now applied in Germany in a general sense to the chief council of any department, political, administrative, judicial, or military.

Aulich, ow'lih, Ludwig, Hungarian general: b. Presburg, 1792, d. Arad, 6 Oct. 1849. After the evacuation of Pesth by the imperial troops in 1849, Aulich made his triumphant entry into that capital, and was received with enthusiasm by the people. In his famous proclamation of Godollo, Kossuth paid also an appropriate homage to Aulich's gallantry. Subsequently, when Gorgey was forced to renounce either the army or the ministry of war, he took the latter alternative, and Aulich was appointed his successor. But although he might have used his authority as minister of war to frustrate Gorgey's negotiations with the Russians, he actually assisted Gorgey to bring these negotiations to a successful close. He was then delivered over to Austria by the Russians, and, in company with 12 others, perished on the gallows.

Aulis, in ancient Greece, a seaport in Boeotia, on the strait called Euripus, between Boeotia and Euboea, noted chiefly for its temple of Artemis, and as the scene of the sacrifice of Iphigenia.

Aullagas, owl-lá'gas, a salt lake in Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desaguadero, and has

only one perceptible, insignificant outlet. The disposition of its superfluous water is, therefore, still a matter of uncertainty.

Aulularia (from *Aulula*, a pot), a comedy by Plautus. Euclion, an old miser, is the principal character.

Aumale, ô-mal', Henri Eugène Philippe Louis d'Orleans, Duke of, 4th son of king Louis Philippe b. Paris, 16 Jan. 1822; d. 7 May 1897. He entered the military service at the age of 17, and distinguished himself by his bravery. At the age of 20, he was promoted to the rank of brigadier-general, and was sent to Algeria, in October 1842. Intrusted with the command of the district of Medeah, he attacked the smala of Abd el Kader with such impetuosity that in less than two hours the emir's troops were entirely routed. As a reward, Aumale was made lieutenant-general and commander of the province of Constantine. In 1847, the young prince, but 25 years old, was intrusted with the general governorship of Algeria, which was taken from the hands of Marshal Bugeaud. This appointment was not approved either by the army or the French nation, and it was the occasion for loud complaints against the ambition of the king, who was concentrating the direction of the whole military service in the hands of his sons. After the revolution of 1848, he went to England, where he devoted his attention to literary pursuits. His latest years were passed in Sicily. He wrote 'Les Institutions Militaires de la France' (1867); 'Histoire des Princes Conde' (1869).

Aumale, a town in France, 35 miles north-east of Rouen, which has given titles to several notables in French history: Jean d'Arcourt, Eighth Count d'Aumale, fought at Agincourt, and defeated the English at Gravelle (1423). Claude II., Duc d'Aumale, one of the chief instigators of the Massacre of St. Bartholomew, was killed 1573. Charles de Lorraine, Duc d'Aumale, was an ardent partisan of the League in the politico-religious French wars of the 16th century. Pop (1900) 2,219.

Aumont, ô-môn', the name of one of the great historical families of France. The first Aumont mentioned in history is JEAN III., SIRE d'AUMONT, who, in 1328, took part in the battle of Cassel, and served under Philip de Valois, on many other important occasions. A more distinguished member of the family was JEAN d'AUMONT: b. 1522; d. 1595. He was on the battlefield almost from his cradle to his grave, and served under six kings: Francis I., Henry II., Francis II., Charles IX., Henry III., and Henry IV. ANTOINE d'AUMONT: b. 1601; d. 1669; served with distinction under Louis XIV., and in 1662 was appointed governor of Paris. LOUIS MARIE VICTOR d'AUMONT and DE ROCHEBARON: b. 1632; d. 1704; took an active part in the war in Flanders under Louis XIV. was governor of Boulogne and the Boulonnais, and member of the academy of inscriptions and belles-lettres. JACQUES, DUC d'AUMONT: b. 1732; d. 1799; was the commandant of the national guard, on 5 Oct. 1789, when Louis XVI. was forcibly taken away from Versailles. LOUIS MARIE CÉLÈSTE DE VIENNE, DUC d'AUMONT: b. 1762; d. 1831; served in Germany, Spain, and Sweden, until the restoration, when he was appointed lieutenant-general. He made

AUNGERVILLE—AURELIUS ANTONINUS

himself very useful to the cause of royalty in suppressing the troubles in Normandy, and in 1815 was created peer of France, and raised to the office of first chamberlain. He was one of the most prominent men at the courts of Louis XVIII. and Charles X., but he exchanged politics for theatres, and became the chief director of the comic opera.

Aungerville, ân'ger-vîl, **Richard**, known as **RICHARD DE BURY** (from his birthplace, Bury St. Edmunds), an English statesman, bibliographer, and correspondent of Petrarch: b. 1281; d. 1345. He entered the order of Benedictine monks, and became tutor to the Prince of Wales, afterward Edward III. Promoted to several offices of dignity, he ultimately became Bishop of Durham, and Lord Chancellor of England. He made the acquaintance of many of the eminent men of the day, and was a diligent collector of books. He was the author of 'Philobiblon,' 'Epistolæ Familiarium,' including letters to Petrarch, etc.

Aura. See **EPILEPSY**.

Au'ramine. See **COAL TAR COLORS**.

Aurangabad, ow-rûn'ga-bad', a town in India; 175 miles from Bombay, and on the Kaum River, a small tributary of the Godavery. It is surrounded by walls with semicircular towers at the different angles, and contains a ruined palace of Aurengzebe and a mausoleum erected to the memory of his favorite wife. A mile to the west of the town are cantonments for cavalry, infantry, and artillery. Aurangabad was founded early in the 17th century, and rose to be a considerable trading centre, but its commercial importance decreased when Hyderabad became the capital of the Nizam. In late years the trade has revived considerably, and embraces wheat, cotton, and manufactured goods. Pop. (1891) 33,887.

Auran'tia. See **COAL TAR COLORS**.

Au'rates. See **AURIC ACID**.

Aurbacher, ow'r'ba-her, **Ludwig**, German author: b. 1784; d. 1847; well remembered by his 'Volksbuchlein' (1827-9); a collection of popular tales, ranking among the best productions of this kind in German literature.

Aure'lia. See **JELLYFISH**.

Aure'lian, **Lucius Domitius Aurelianus**, one of the later emperors of Rome: b. about 212; d. 275. He was the son of a peasant of Illyricum, and rose to the highest rank in the army, and even to the consulate; which good fortune was increased by a wealthy marriage. Claudius II., on his death-bed, in 270, recommended Aurelian to the choice of the troops of Illyricum, who readily acceded to his wishes. He delivered Italy from the barbarians, reduced Tetricus, who had been unwillingly made to assume the purple in Gaul, and conquered the famous Zenobia, queen of Palmyra. Aurelian followed up his victories by the reformation of abuses, and the restoration throughout the empire of order and regularity, but tarnished his good intentions by the general severity of his measures, and the sacrifice of the senatorian order to his slightest suspicions. He had planned a great expedition against Persia, and was waiting in Thrace for an opportunity to cross the straits, when he lost his life by assassination, the result of a conspiracy ex-

cited by a secretary whom he intended to call to account for peculation. Aurelian was a wise, able, and active prince, and well deserved the title given him by the Senate of "Restorer of the Roman Empire."

Aure'lian, a historical novel by William Ware, an American author born in 1797. It was first published in 1838 under the title 'Probus,' and was a sequel to 'Letters of Lucius M. Piso,' published the year before; and like that novel, written in the form of letters. The full title is 'Aurelian; or, Rome in the Third Century. In Letters of Lucius M. Piso, from Rome, to Fausta, the daughter of Gracchus at Palmyra.' The novel presents a singularly faithful picture of the Rome of the second half of the 3d century.

Aure'lian Wall, a wall around Rome, built mostly by the emperor Aurelian, but completed in the reign of Probus. It was almost 12 miles long, and 54 feet high, enclosing an area of 5,000 square miles, and marking the boundaries of Rome in the time of Aurelian. The wall was built in great haste as a defense against the barbarians, and includes the remains of house- and garden-walls. It was fairly well preserved until recently, but is now rapidly falling to decay.

Aure'lius Antoninus, Marcus, often called simply **MARCUS AURELIUS**, a distinguished Roman, and according to Canon Farrar, "the noblest of pagan emperors" b. Rome, 29 April 121 A.D.; d. Vindobona,—the modern Vienna—17 March 180 A.D. He was descended from an illustrious line which tradition declared extended to the good Numa, the second king of Rome. In the descendant Marcus were certainly to be found, with a great increment of many centuries of noble life, all the virtues of his illustrious ancestor. Doubtless the cruel persecutions of the infamous emperors who preceded Hadrian account for the fact that the ancestors of Aurelius left the imperial city and found safety in Hispania Bætica, where in a town called Succubo,—not far from the present city of Cordova—the emperor's great-grandfather, Annianus Verus, was born. From Spain also came the family of the emperor Hadrian, who was an intimate friend of Annianus Verus. The death of the father of Marcus Aurelius when the lad was of tender years led to his adoption by his grandfather and subsequently by Antoninus Pius. By Antoninus he was subsequently named as joint heir to the imperial dignity with Commodus, the son of Ælius Cæsar, who had previously been adopted by Hadrian. From his earliest youth Marcus was distinguished for his sincerity and truthfulness. "Hadrian's bad and sinful habits left him," says Niebuhr, "when he gazed on the sweetness of that innocent child. Punning on the boy's paternal name of Verus, he called him Verissimus, 'the most true.'" Among the many statues of Marcus extant is one representing him at the tender age of eight years offering sacrifice. He was even then a priest of Mars. It was the hand of Marcus alone that threw the crown so carefully and skilfully that it invariably alighted upon the head of the statue of the god. The entire ritual he knew by heart. The great emperor Antoninus Pius lived in the most simple and unostentatious manner; yet even this did not satisfy the exacting, lofty spirit of Marcus. At 12 years

AURELIUS ANTONINUS

of age he began to practise all the austerities of Stoicism and became a veritable ascetic. He ate most sparingly; slept little, and when he did so it was upon a bed of boards. Only the repeated entreaties of his mother induced him to spread a few skins upon his couch. His health was seriously affected for a time; and it was, perhaps, to this extreme privation that his subsequent feebleness was largely due. His education was of the highest order of excellence. His tutors, like Nero's, were the most distinguished teachers of the age; but unlike Nero, the lad was in every way worthy of his instructors. His letters to his dearly beloved teacher, Fronto, are still extant, and in a very striking and charming way they illustrate the extreme simplicity of life in the imperial household in the villa of Antoninus Pius at Lorum by the sea. They also indicate the lad's deep devotion to his studies and the sincerity of his love for his relatives and friends. When his predecessor and adoptive father Antoninus felt the approach of death, he gave to the tribune who asked him for the watchword for the night the reply "Equanimity," directed that the golden statue of 'Fortune' that always stood in the emperor's chamber be transferred to that of Marcus Aurelius, and then turned his face and passed away as peacefully as if he had fallen asleep. The watchword of the father became the life-world of the son, who pronounced upon that fether in the 'Meditations,' one of the noblest eulogies ever written. It would be impossible here to detail even briefly all the manifold public services rendered by Marcus Aurelius to the empire during his reign of 20 years. Among his good works were these: the establishment, upon eternal foundation, of the noble fabric of the civil law—the prototype and basis of Justinian's task; the founding of schools for the education of poor children; the endowment of hospitals and homes for orphans of both sexes; the creation of trust companies to receive and distribute legacies and endowments; the just government of the provinces; the complete reform of the system of collecting taxes; the abolition of the cruelty of the criminal laws and the mitigation of sentences unnecessarily severe; the regulation of gladiatorial exhibitions; the diminution of the absolute power possessed by fathers over their children and of masters over their slaves; the admission of women to equal rights to succession to property from their children; the rigid suppression of spies and informers; and the adoption of the principle that merit, as distinguished from rank or political friendship, alone justified promotion in the public service. But the greatest reform was the reform in the imperial dignity itself, as exemplified in the life and character of the emperor. It is this fact which gives to the 'Meditations' their distinctive value. The infinite charm, the tenderness, and sweetness of their moral teachings, and their broad humanity, are chiefly noteworthy because the emperor himself practised in his daily life the principles of which he speaks, and because tenderness and sweetness, patience and pity, suffused his daily conduct and permeated his actions. The horrible cruelties of the reigns of Nero and Domitian seemed only awful dreams under the benignant rule of Marcus Aurelius. It is not surprising that the deification of a deceased emperor, usually regarded by senate and people

as a hollow mockery, became a veritable fact upon the death of Marcus Aurelius. He was not regarded in any sense as mortal. All men said he had but returned to his heavenly place among the immortal gods. As his body passed, in the pomp of an imperial funeral, to its last resting-place, the tomb of Hadrian,—the modern Castle of St. Angelo at Rome,—thousands invoked the divine blessing of Antoninus. His memory was sacredly cherished. His portrait was preserved as an inspiration in innumerable homes. His statue was almost universally given an honored place among the household gods. And all this continued during successive generations of men. Marcus Aurelius has been censured for two acts: the first, the massacre of the Christians which took place during his reign; the second, the selection of his son, Commodus, as his successor. In extenuation of his persecution of the followers of Christianity, it has been alleged in his behalf that he was deceived by evil counsellors, who misrepresented the conduct of the Christians to him. This excuse impinges upon his wisdom as a ruler and his admittedly wide knowledge of the conditions of the empire. It is further urged that when we take into consideration the environment of the emperor, no just cause for condemnation of his course remains. He imbibed a bitter prejudice against the new religion from his beloved friend and instructor, Fronto. In the writings of Epictetus, whom he greatly revered, he found severe condemnation of the Christians as fanatics. With such a profound natural bias, it is urged, it is no wonder that he was led to regard the new creed with aversion. But the reason of his course is to be found rather in his deep-rooted attachment to the heathen beliefs of his ancestors and of the empire. It was rather his fear that the ancient cult, bound up as it seemed in the character of Roman rule, was seriously menaced by the progress of Christianity, which actuated him to the severe and bloody measures he took to root out a dangerous rival. Regarding Christianity as a 'pernicious sect,' a 'secret conspiracy' against the empire, an 'immoral superstition,' whose poison was eating into the social life, and himself as the conservator of the empire and its traditions, some extenuation might be conceded to such fierce zeal in persecuting the Christians in almost any other emperor that Marcus Aurelius. For there is a glaring inconsistency in his character in the adoption of so cruel and monstrous a course by one who appears otherwise so admirable. In this signal instance he is as bloody and heartless as a Domitian, a Nero or a Caligula; in all other things merciful, in this pitiless; in his general administration, just and humane; in this, singularly unjust and even vindictive. Whatsoever may be urged in his defense, this relentless persecution of the Christians is a dark blot on his fame. Whatever extenuating circumstances may seem to condone it, his policy in this instance was utterly inconsistent with his general character.

His first edict against the Christians was published in 177. Multitudes perished in the fierce persecutions which followed. Notable amongst the victims were St. Polycarp in Smyrna and St. Caecilia at Rome. The manner in which they were tortured before being relieved from sufferings by death was more befitting a savage chief than a civilized ruler.

AURELIUS—AURORA

Of the appointment of Commodus as his successor, it may be said that the paternal heart hoped against hope for filial excellence. Marcus Aurelius believed, as clearly appears from many passages in the 'Meditations,' that men did not do evil willingly, but through ignorance; and that when the exceeding beauty of goodness had been fully disclosed to them, the depravity of evil conduct would appear no less clearly. The emperor who, when the head of his rebellious general was brought to him, grieved because that general had not lived to be forgiven; the ruler who burned unread all treasonable correspondence, would not, nay, could not believe in the existence of such an inhuman monster as Commodus proved himself to be. The appointment of Commodus was a calamity of the most terrific character; but it testified in trumpet tones to the nobility of the emperor's heart, the sincerity of his own belief in the triumph of right and justice. See FARRAR, 'Seekers after God' (1868); RENAN, 'Marc Aurèle' (1881); PATER, 'Marius the Epicurean.'

Aurelius, Victor Sextus, Roman historian of the 4th century whose 'De Cæsantres' is a collection of biographical sketches of the emperors from Augustus to Constantine.

Aurengzebe, â'rang-zéb'. See AURUNGZEBE.

Aureole, or **Aureole**, in paintings, an illumination surrounding a holy person, as Christ, a saint, or a martyr, intended to represent a luminous cloud or haze emanating from him. It is generally of an oval shape, but may be nearly or quite circular, and differs from the nimbus surrounding the heads of sacred personages in being an emanation of light from the whole body.

Aureosin. See COAL TAR COLORS.

Aureus, â're-üs, or **Aureus Nummus**, the earliest gold coin of Rome, coined 207 B.C., in the second Punic war. It weighed 2 denarii, and 1 quinarius, and was worth 25 denarii, or 100 sesterces. In later times it was called *solidus*, but had diminished in value.

Auric Acid. Trioxid of gold, Au_2O_3 , does not combine with acids to form salts, but a hydrated form of the oxid, $Au_2O_3 \cdot H_2O$, is known, which unites with bases to form salts. From this acid-like property, the hydrated oxid has been called "auric acid." Compounds of auric acid with bases are called "aurates." Aurate of potassium, $Au_2O_3 \cdot K_2O \cdot 3H_2O$, is a crystalline substance, readily dissolving in water with the formation of an alkaline solution. When digested with ammonium sulphate, auric acid yields an aurate of ammonia of undetermined composition, called "fulminating gold." This substance is yellowish-brown in color, when in the solid form, and decomposes explosively upon percussion, or when heated to 212° F.

Aurichalcite (-kal'-), a native basic carbonate of copper and zinc, usually occurring in beautiful bright blue or green, pearly incrustations, composed of ill-defined monoclinic (?) crystals or scales. Its hardness is 2, and its specific gravity about 3.6. It has been found in Greece, Italy, England and various other European countries, and in fine specimens at Morenci in Arizona, Magdalena in New Mexico, in Colorado, Montana, Utah and elsewhere.

Auricle. See EAR.

Auricles of the Heart. See HEART; CIRCULATION.

Auricula, a hardy perennial herb, *Primula auricula*, of the natural order *Primulaceae*, found in the mountainous parts of central Europe. The wild plant has an umbel of small yellow flowers on a short stalk, which rises from a set of radial leaves. By selection a very large number of varieties have been produced. These have long stalks and very diversely colored, fragrant large flowers, for which the plant is widely cultivated in Europe. Since the climate of the United States is hot and dry, the plant is almost confined to greenhouses. It is propagated by means of seeds and offsets, and succeeds best on rich, light, loamy soil.

Auricular Confession. See CONFESSION; PENANCE; SACRAMENTS.

Aurifa'ber, the Latinized name of JOHANN GOLDSCHMIDT, one of Luther's friends: b. 1519; d. Erfurt, 1579. He became pastor at Erfurt in 1566. He collected the unpublished manuscripts of Luther, and edited the 'Epistolæ' and the 'Table-Talk.'

Auri'ga, in astronomy, the Wagoner, a constellation of the northern hemisphere, containing 68 stars, including Capella, a star of the first magnitude.

Aurillac, ô're-yak', a town of France, 272 miles south of Paris. It is noted for its ancient buildings, among which are the Church of Notre Dame, constructed in the 13th century, and the castle of St. Stephen. It has manufactures of jewelry, copper, kettles, paper, woolen stuffs, and carpets. Pop. (1896) 13,531.

Au'rin, **Au'rine**, a trade name for impure rosolic acid (q.v.).

Au'ringer, **Obadiah Cyrus**, American poet: b. Glens Falls, N. Y., 4 June 1849. He served for some years in the United States navy. In 1875 he became a farmer in his native place. Among his works are: 'Voices of a Shell,' 'Scythe and Sword' (1887); 'Episode of Jane McCrea'; and 'The Book of the Hills.'

Aurochs, ä'röks, the European bison (*Bos bonasus*, or *Bison europæus*) called by the Germans "wisent" and in the Slavonic languages "zubr" or "suber." This great bison stands six feet or more in height at the shoulder, and closely resembles the American bison or "buffalo" (q.v.); it is believed, indeed, that the American animal descended from the ancestral race of aurochs. When the Romans spread northward into Europe they found these and other oxen in the forests wherever they went, and even down to the days of Charlemagne they were spread over Germany and were beasts of chase. They have steadily diminished, however, until now they exist only as a single herd in the royal forest-preserves of Bielovege, in Lithuania, which in 1899 numbered 700, while a few hundred roam in the Caucasian Mountains. See BISON.

Aurora, Ill., city, Kane County; on Fox River, and on the Chicago, B. & Q., the Chicago & N. W., the Elgin, J. & E., and the Illinois, I. & M. R.R.'s. It was founded in 1834 by Joseph and Samuel McCarty; was organized as a village in 1857, and was incorporated as a city in 1887. It is an important manufacturing city, having a variety of extensive establishments; these include the shops of the Chicago, Burling-

AURORA—AURORA BOREALIS.

ton & Quincy Railroad, cotton mills, a wheel-scraper manufactory, carriage and wagon factories, smelting-works, and foundries and machine shops. There are five national banks with a combined capital of \$600,000, and a State bank. There are 38 churches, a good system of public schools including two high schools, the East Aurora High School and the West Aurora High School, the latter established in 1870; and a public library, a building for which was presented by Andrew Carnegie. It is also the seat of Aurora Business College and of the Jennings Seminary for young women. The government is vested in a mayor and a city council of 14, seven of which are elected each year for a term of two years; the city officials are elected by the people. The waterworks and the electric light plant are owned and operated by the city. Pop. (1890) 19,688; (1900) 24,147; (1904; estimated) 28,000.

Auro'ra, Ind., town in Dearborn County, on the Ohio River; C., C., C. & St. L., and the Ohio and Miss. R.R.'s. It has regular steamboat connection with Cincinnati. There are extensive car shops here, and a large grain and hay trade. Pop. (1900) 3,645.

Auro'ra, Mo., a city in Lawrence County, situated on the Kansas City, Fort Scott, and Memphis R.R.'s., about 18 miles northwest of Pierre City. The chief industries are fruit growing, lead and zinc mining, and farming. There are also flour mills, foundries, and machine shops. Aurora has two banks with \$75,000 capital. Pop. (1900) 6,191.

Auro'ra, N. Y., a village in Cayuga County, situated on Cayuga Lake; 25 miles northwest of Ithaca; on the Lehigh Valley R.R. It is the centre of an agricultural region, and is a residential town and excellent summer resort. It is the seat of Wells College for Women. Pop. (1900) about 1,000.

Auro'ra (Greek, *Eōs*), in mythology, daughter of Hyperion and Theia, and sister of Helios and Selene. She is goddess of the dawn; rises from the ocean, drawn by the celestial horses, Lampus and Phæthon, and with rosy fingers raises the veil of night, shedding light upon the world.

Auro'ra, a famous painting by Guido Reni, on the ceiling of the Casino Rospigliosi in Rome.

Auro'ra Bo'rea'lis (French, *aurora boréale*; German, *Nordlicht*), the northern light. An illumination in the sky, seen oftenest north of middle latitudes in the northern hemisphere, and south of them in the southern hemisphere. In our hemisphere it is generally visible in the north, and has, therefore, been called the Aurora Borealis. In the southern hemisphere it is called the Aurora Australis.

The frequency with which it is seen varies with the latitude of the place. It is comparatively rare within 45° of the equator, but becomes more frequent toward the north up to the latitudes of about 60°, where it sometimes becomes almost a nightly occurrence. Nearer the pole it again becomes less frequent. We shall first describe it as it is commonly seen in our own latitudes. The first noticeable phenomena commonly occurs after the end of twilight, when the northern sky near the horizon will be seen illuminated with a light somewhat like that of the dawn. Careful examination will show, how-

ever, that the illumination is in the form of a broad arch, highest near the magnetic north, and reaching the horizon in the northeast and northwest directions. Presently beams of light are seen crossing this arch with a quivering or flickering motion, and shooting toward the zenith. Each beam constantly varies in brightness and seemingly fades away to give place to another.

In more northern latitudes, say north of 45° or 50°, these beams form the most brilliant feature of the aurora. Sometimes they are arranged in curved, wavy lines like the slats of a window shade flying in the wind, giving the appearance of a scroll in the process of being unrolled. In the case of a very brilliant aurora the beams may cover almost or quite the entire sky. In this case they will be seen to converge toward a point commonly not far from the zenith. The appearance presented by the beams grows out of the direction in which they are seen and to the laws of perspective. Long-repeated observations show that the rays are really parallel to the direction of the dipping needle, or to the lines of the earth's magnetic force. In the latitudes which we have mentioned, the dip is commonly more than 60°, increasing to 90° at the magnetic pole; hence when a great number of beams, all parallel to each other, are viewed from a point on the earth's surface under the region in which they are found, they all seem to converge according to the laws of perspective, toward that part of the sky to which the upper (south) pole of a dipping needle is directed. If the parallelism to the magnetic lines is exact, the direction of this point should be the same as that of the compass needle itself. It is still an open question where the parallelism is exact. Many observations seem to show a deviation of 10° or more, but the determination of the exact centre of convergence is difficult unless the rays are so numerous as to cover a large part of the sky, and it is not certain that the deviation may not be due to errors of estimation.

The Nature of the Auroral Light.—As a general, perhaps universal, rule, the rays or beams which we have described have a slightly yellowish tinge. When their light is analyzed with the spectroscope, several lines, sometimes as many as 12, are found in the spectrum. Of these the brightest and most constant is in the yellowish green part of the spectrum, having a wave length of 557. This line is characteristic of the aurora, but has not been identified with that emitted by any known substance.

The light of an aurora does not proceed wholly from the beams. Very irregular sheets of light, having the appearance of thin luminous clouds, are often seen. These are of various colors, red being especially frequent. The appearance is then that of a red cloud illuminated by the rays of the sun sometime after the latter has set. The light can, however be easily distinguished from that of a cloud by its diffused character and the absence of any definite outline. The height of the region in which the auroras are formed has never been definitely determined. The most important question is, whether the height is, in any case, above the upper limit of the atmosphere. This question is all the more difficult in that this limit is in itself an uncertain quantity. Observations of shooting

AURORA LEIGH—AUSABLE CHASM

stars show that these objects become visible at a height of about 100 miles above the earth's surface. The limit of the atmosphere must therefore be as high as this, and may be much higher. The difficulty of making observations upon the same auroral beams, at one moment, at different points of the region from which they are visible, is such that no exact determination of the height of a beam has ever been made. There is some reason to believe that the height may range from 100 to 150 miles, but there is no reason to believe that a beam is ever seen above the possible limit of the atmosphere.

The lower limit of the aurora is undetermined. Observers have sometimes been supposed to see a beam between their own position and a mountain or other terrestrial object, but this was probably one of those optical illusions from which even the best observers can scarcely free themselves. It is also very frequently believed in countries where auroras are numerous that the phenomenon is accompanied by a crackling sound, somewhat resembling the rustling of silk or straw. As these sounds have been more difficult to hear, the more accurate and well-trained the ear of the observer, the presumption is that they are entirely illusory. It is a well-known psychological fact that when a phenomenon is seen which is commonly associated with sound, many people fancy that the latter is heard even in cases where it is manifestly impossible. A familiar instance of this sort is the rocket-like sound which many persons fancy to accompany the passage of a brilliant meteor through the air. Apart from the fact that such a sound could not possibly have come from the meteor, we have the fact that only untrained observers ever hear these sounds.

Cause of the Aurora.—Science has not been able to as yet determine with certainty and precision the cause of this very common phenomenon. When the luminous effect produced by the passage of electricity through the highly rarefied air of a vacuum tube was first observed, its resemblance to the aurora led to the view that the latter was produced by electric currents in the upper regions of the atmosphere. Although it is not impossible that such currents may be associated with the aurora, they do not adequately explain its light, and are apparently inadequate to explain its rays. Yet there is no doubt that the aurora is associated in some way with the magnetism of the earth. The coincidence of the rays of the aurora with the direction of the magnetic needle is one proof of this relation; another proof is found in the relation of the aurora to magnetic storms. The general rule is, that a very brilliant aurora is associated with such a storm, disturbing the magnetic needle not only at the point where the aurora is visible, but perhaps over the whole earth. Earth currents so strong that from time to time a line of telegraph may be run by them are also occasional accompaniments of a brilliant aurora, but although the intimate connection of the two phenomena is so well established, the exact relationship is yet to be worked out. In recent years Arrhenius has propounded a theory, based on the very probable fact that the sun emits a flood of corpuscles of a nature similar to that of the mysterious rays known as X-rays, cathode rays, electrons, etc., the investiga-

tion of which has occupied so large a place in recent physics. His theory is, that these corpuscles on approaching the earth are acted on in the direction of the lines of its magnetic force round which they describe helices. While nothing as yet has been found to disprove this theory, it is one which still needs much proving. What can be said with reasonable probability is that the aurora is caused by irregular emanations of corpuscles from the sun, which are stopped in the upper regions of our atmosphere.

Periodicity of the Aurora.—Records of auroras extending back two centuries or more show that they have been much more numerous at some period than at others. Sometimes it has been supposed that they have been more numerous at intervals of 33 or some fixed number of years, but this has not yet been proved, nor has any law been determined by which we can definitely say at what times they appear in the greatest number. But several periods are observed which show that the appearance of the aurora is in some way connected with the sun. The first instance of this is the fact that they are more numerous when the spots of the sun are more numerous. As there is an 11-year period in the spots on the sun, so there is a corresponding period in the aurora. There is also a semi-annual period in the frequency of the aurora, the greatest number being observed in March and September and the smallest in June and December. Arrhenius has connected this with the fact that in March and September the earth is over the region of the sun's surface in which spots are more numerous. Statistics also show that there are more auroras in the northern hemisphere when the moon is south of the equator than when she is north. This, however, is not proved to be a general law. There is also an observed period of 25.93 days in the frequency of the aurora. This is so near the time of the sun's rotation that it may be connected with the latter. Consult: Angot, 'The Aurora,' International Scientific Series.

SIMON NEWCOMB, LL.D.

Auro'ra Leigh, lē, a blank verse novel by Mrs. Browning, published 1857. The book discusses various theories for the regeneration of society, and is filled with passages of great beauty, and ethical utterances of a lofty nature.

Aurangzebe, ā'rūng-zēb', the last important emperor of Hindustan, of the Mogul dynasty: b. 22 Oct. 1618; d. Ahmednuggur, 21 Feb. 1707. He was the son of Shah Jehan, and properly named Mohammed, but received from his grandfather that of Aurangzebe (Ornament of the Throne), by which he is known to history. Aurangzebe, in 1658, was crowned sole monarch of the great Mogul empire.

Ausable (ō-sā'b'l) **Chasm**, a picturesque and popular American summer resort, in New York State; 12 miles from Plattsburg, and 1 mile from Keeseville. It is an isolated formation, wholly independent of, and disconnected from, any other similar panorama. At the beginning of the chasm, the river is hemmed into a channel not more than 10 feet wide by walls of rock from 100 to 200 feet high. Lower down the walls gradually spread apart till in some places there is a distance between them of 50 feet, and then extend with sharp turns and occasional enlargements for nearly 2 miles.

AUSCULTATION—AUSTEN

Lateral fissures, narrow, and deep, project from the main ravine at nearly right angles, and through one of these a staircase of over 200 feet reaches to the abyss. The walls are formed of laminae of sandstone, laid in precise and regular order, and their crevices are filled with a thick growth of hardy pines and cedars. The trip through the chasm may be made in a small boat or on foot. For the accommodation of tourists, stone walks with substantial iron railings and firm bridges have been constructed.

Auscultation, a method of examining the body by means of the sounds given to the ear. The naked ear may be used, or instruments, such as the stethoscope (q.v.), or the phoneidoscope be employed. The natural sounds may be alone investigated, as in listening to the breathing sounds, or the heart sounds, or the organ, or that portion contiguous or remote from the organs, may be tapped, or percussed, to determine variations in the resonance. All of the parts of the body may be investigated by these means. Auscultation is probably, next to inspection, the oldest mode of investigation. Hippocrates II. used it extensively, but it was not until Lænnec, in 1816, gave his demonstrations that the method came to be recognized as one of the most important in the diagnosis of diseased conditions. Consult Butler, 'Diagnostics of Internal Medicine' (1901); Sahl, 'Untersuchungsmethoden.' See PERCUSSION.

Auso'nia, a poetical synonym for Italy; so used by Virgil and other Roman poets.

Auso'nus, Decius Magnus, the most distinguished Roman poet of the 4th century A.D. b. Burdigala (Bordeaux) about 310; d. about 392. He studied under several distinguished masters, and became at last professor of rhetoric in his native city, whence his fame extended through the whole empire. Valentinian intrusted to him the education of his son, Gratian, and appointed him afterward quaestor and praetorian prefect. After Gratian had ascended the throne he showed himself not less grateful to his preceptor. About the year 379 he appointed him consul in Gaul. After the death of Gratian, Ausonius lived upon an estate at Bordeaux, devoted to literary pursuits. As Valentinian was of the Christian religion, it is probable that Ausonius was so, too; and many of his writings confirm this conjecture. Critics are not unanimous on the subject of his poetical merits. He is undeniably learned and ingenious, but his style and versification have the blemishes of the age, and his Latin is impure. His epigrams, idyls, eclogues, letters in verse, etc., are extant. The best edition is that of 'Peiper' (1886).

Aus'pices, among the Romans, omens, especially those drawn from the flight or other movements of birds, supposed to be indications of the will of heaven, and to reveal futurity. At first only the augurs took the auspices, but after a time civil officers, discharging important functions had the right of doing so. Two kinds of auspices, however, arose—a greater and a lesser; the former reserved to dictators, consuls, censors, praetors, or the commander-in-chief in war; the latter permitted to less exalted functionaries. The glory of a successful enterprise was universally assigned to the person who took the auspices, and not to the leader of

the enterprise itself; hence, the phrase arose, to carry on a war "under the auspices" of the emperor or some other high authority. See AUGURS.

Aussig, ow'sig, a town in Bohemia, near the junction of the Bila with the Elbe; 42 miles north-northwest of Prague. It has large manufactures of woollens, chemicals, etc. Pop. (1901) 38,407.

Aus'ten, Jane, a celebrated English novelist: b. Steventon, Hampshire, 10 Dec. 1775; d. Winchester, 18 July 1817. Her father was a clergyman of the Established Church, and accomplished enough to fit his boys for the university. Her mother was a clever woman, full of epigram and humor in conversation. From her cradle, she was used to hearing agreeable household talk, and the freest personal criticism on the men and women who made up her small, secluded world. It was in the Steventon rectory in the family room, where she was interrupted 20 times in an hour, that the shrewd and smiling social critic managed, before she was 21, to write her famous 'Pride and Prejudice.' Here, too, 'Sense and Sensibility' was finished in 1797, and 'Northanger Abbey' in 1798. The first of these, submitted to a London publisher, was declined as unavailable, by return of post. The second, the gay and mocking 'Northanger Abbey,' was sold to a Bath bookseller for £10, and several years later bought back again, still unpublished, by one of Miss Austen's brothers. For the third story she seems not even to have sought a publisher. These three books, all written before she was 25, were evidently the employment and delight of her leisure. The serious business of life was that which occupied other pretty girls of her time and her social position—dressing, dancing, flirting, learning a new stitch at the embroidery frame, or a new air on "the instrument"; while all the time she was observing, with those soft, hazel eyes of hers, what honest Nym calls the "humors" of the world about her. In 1801, the family removed to Bath, then the most fashionable watering-place in England.

For a period of eight years, spent in Bath and in Southampton, Miss Austen wrote nothing save some fragments of 'Lady Susan' and 'The Watsons,' neither of them of great importance. In 1809 the lessened household, composed of the mother and her two daughters only, removed to the village of Chawton, on the estate of Mrs. Austen's third son; and here, in a rustic cottage, now become a place of pilgrimage, Jane Austen again took up her pen. She rewrote 'Pride and Prejudice,' 'Sense and Sensibility,' and between February 1811 and August 1816 completed 'Mansfield Park,' 'Emma,' and 'Persuasion.' At Chawton, as at Steventon, she had no study, and her stories were written near a window in the family sitting-room, where she must often have been interrupted by the prototypes of her Mrs. Allen, Mrs. Bennet, Miss Bates, Mr. Collins, or Mrs. Norris. When at last she began to publish, her stories appeared in rapid succession: 'Sense and Sensibility' in 1811; 'Pride and Prejudice' early in 1813; 'Mansfield Park' in 1814; 'Emma' in 1816; 'Northanger Abbey' and 'Persuasion' in 1818, the year following her death.

The six novels which have made so great a reputation for their author relate the least

AUSTEN — AUSTIN

sensational of histories in the least sensational way. 'Sense and Sensibility' might be called a novel with a purpose, that purpose being to portray the dangerous haste with which sentiment degenerates into sentimentality; and because of its purpose, the story discloses a less excellent art than its fellows. 'Pride and Prejudice' finds its motive in the crass pride of birth and place that characterize the really generous and high-minded hero, Darcy, and the fierce resentment of his claims to love and respect on the part of the clever, high-tempered, and chivalrous heroine, Elizabeth Bennet. 'Northanger Abbey' is a good-natured satire at the school of Mrs. Radcliffe; 'Persuasion,' a simple story of upper middle-class society; 'Mansfield Park,' a new and fun-loving version of 'Cinderella'; and 'Emma,' the history of the blunders of a bright, kind-hearted, and really clever girl, who contrives as much discomfort for her friends as stupidity or ill nature could devise. Numberless as are the novelist's characters, no two clergymen, no two British matrons, no two fussy spinsters, no two men of fashion, no two heavy fathers, no two smart young ladies no two heroines are alike. And this variety results from the absolute fidelity of each character to the law of its own development, each one growing from within and not being simply described from without. Nor are the circumstances which she permits herself to use less genuine than her people. What surrounds them is what one must expect; what happens to them is seen to be inevitable.

The low and quiet key in which her "situations" are pitched produces one artistic gain which countervails its own loss of immediate intensity: the least touch of color shows strongly against that subdued background. A very slight catastrophe among those orderly scenes of peaceful life has more effect than the noisier incidents and contrived convulsions of more melodramatic novels. Thus, in 'Mansfield Park' the result of private theatricals, including many rehearsals of stage love-making, among a group of young people who show no very strong principles or firmness of character, appears in a couple of elopements which break up a family, occasion a pitiable scandal, and spoil the career of an able, generous, and highly promising young man. To most novelists an incident of this sort would seem too ineffective; in her hands it strikes us as what in fact it is — a tragic misfortune and the ruin of two lives. In a word, it is life which Miss Austen sees with unerring vision and draws with unerring touch. See Austen-Leigh, 'Memoir of Jane Austen' (1871); Goldwin Smith, 'Life of Jane Austen' (1890); Adams, 'The Story of Jane Austen's Life' (1891); Malden, 'Jane Austen' (1889); Hill 'Jane Austen and Her Friends' (1900); Pollock, 'Jane Austen' (1899).

Aus'ten, Peter Townsend, American chemist: b. Clifton, N. Y., 1852, and educated at Columbia University, School of Mines, and in Germany and Switzerland. In 1876, he was appointed instructor of chemistry at Dartmouth; in 1877, professor of chemistry at Rutgers. From 1887 to 1893 he was engaged in industrial work, and 1893-8 was professor of chemistry at Brooklyn Polytechnic Institute. He has invented several useful manufacturing processes; has written a number of valuable papers, and translated Pinner's 'Repetitorium der Organ-

ischen Chemie' under the title 'An Introduction to the Study of Organic Chemistry.'

Austerlitz, ows'ter-lets, Moravia, a town on the Littawa, 13 miles southeast of Brunn. In the vicinity, on 2 Dec. 1805, was fought the famous battle between the French army of 80,000 men, commanded by Napoleon, and the combined Russian and Austrian armies, numbering 84,000, under their respective emperors; in which the former achieved a signal victory. According to Alison, the allies lost 30,000 in killed, wounded, and prisoners, and the French, 12,000. The battle was followed by an armistice, the terms of which were dictated by Napoleon; and immediately after, on 26 December, by the Treaty of Presburg, which disastrously affected Austria. The battle of Austerlitz is sometimes called "The Battle of the Three Emperors."

Aus'terlitz, The Sun of, a term given to any favorable omen, in allusion to the brilliant appearance of the sun just before the battle of Austerlitz, and which Napoleon accepted as a token of coming victory.

Aus'tin, Saint. See AUGUSTINE, SAINT.

Aus'tin, Alfred, English poet, critic, and journalist: b. Headingly, near Leeds, 30 May 1835. He graduated from the University of London in 1853, was called to the bar in 1857, and was editor of the 'National Review,' (1883-93). In 1896 he was appointed poet laureate of England. He is the author of political books, novels, and many volumes of verse. The latter include 'The Season: a Satire' (1862); 'The Human Tragedy' (1862); 'The Golden Age: a Satire' (1871); 'The Tower of Babel,' a drama (1874); 'Savonarola,' a tragedy (1881); 'Veronica's Garden,' in prose and verse (1895). 'The Garden That I Love,' 'In Lamia's Winter Quarters,' and 'Haunts of Ancient Peace' (1902), are delightful volumes of mingled prose and verse. Opinion is much divided as to his merits as a poet, particularly in such works as 'Fortunatus, the Pessimist' (1891). In December 1899, he published a war poem, 'To Arms!' and, in May 1900, one on the relief of Mafeking.

Aus'tin, George Lowell, American physician and writer: b. Massachusetts, 1849; d. 1893. Among his numerous works are 'Perils of American Women'; 'Water-Analysis' (1882); 'Under the Tide'; 'Life of Franz Schubert'; 'Popular History of Massachusetts'; 'Life of Wendell Phillips' (1888).

Aus'tin, Henry, American lawyer and legal writer: b. Boston, Mass., 21 Dec. 1858. He is the author of several valuable books on 'American Farm and Game Laws'; 'American Fish and Game Laws'; 'Liquor Law in New England.'

Aus'tin, Jane (GOODWIN), American novelist: b. Worcester, Mass., 25 Feb. 1831; d. Boston, 30 March 1894. Her reputation rests on excellent stories describing the Pilgrim Fathers and the early colonists of Massachusetts, and include 'Fairy Dreams' (1860); 'Moonfolk' (1874); 'Mrs. Beauchamp Brown' (1880); 'A Nameless Nobleman' (1881); 'The Desmond Hundred' (1882); 'Nantucket Scraps' (1882); 'Standish of Standish' (1889); 'Betty Alden' (1891); and 'David Alden's Daughter and Other Stories' (1892).



From the Hollyer photograph after Linnel

JANE AUSTEN

AUSTIN

Aus'tin, John, English writer on jurisprudence: b. Creeling Mill, Suffolk, 3 March 1790; d. Weybridge, 1 Dec. 1859. From 1826 to 1835 he filled the chair of jurisprudence at London University. He served on several royal commissions, one of which took him to Malta; lived for some years on the Continent, and finally settled at Weybridge in Surrey. His fame rests on his great works, 'The Province of Jurisprudence Determined,' published in 1832; and his 'Lectures on Jurisprudence,' published by his widow between 1861 and 1863. His wife, Sarah, one of the Taylors of Norwich: b. 1793; d. Weybridge, 8 Aug. 1867; produced translations of German works, and other books bearing on Germany or its literature; also 'Considerations on National Education,' etc.

Aus'tin, Jonathan Loring, secretary and treasurer of Massachusetts: b. Boston, 2 Jan. 1748; d. 10 May 1826. He remained two years in Paris as Dr. Franklin's secretary. He also spent two years in England as agent of Dr. Franklin. On his return in May 1779, he was liberally rewarded by Congress. In 1780, in his passage to Spain as agent of the State, he was taken and carried to England. He afterward held the offices of state secretary and treasurer in Massachusetts, and died universally respected. His son, James Trecothick: b. Boston, 7 Jan. 1784, studied law, rose in the profession, and was attorney-general of the State from 1832 to 1843.

Aus'tin, Moses, an American who obtained the first grant from the Mexican government for the formation of an American colony in Texas: b. Durham, Ct.; d. January 1821. He forwarded to the commandant-general at Monterey, an application for permission to colonize 300 families in some part of Texas. The application was successful, and the enterprise prosecuted by his son, Stephen F. Austin (q.v.).

Aus'tin, Oscar Phelps, American statistician, chief of the bureau of statistics, treasury department: b. Illinois. At the age of 12 he removed with his parents to Nebraska, where he remained until manhood. He then engaged in journalism until his appointment as chief of the bureau of statistics, 9 May 1898. He has since lived in Washington, serving as Washington correspondent for newspapers in New York, Chicago, and other cities. He is the author of 'Uncle Sam's Secrets'; 'Uncle Sam's Soldiers'; and other publications for the instruction of youth in national and international affairs; also of official monographs 'Commercial China in 1900'; 'Commercial Japan'; 'Commercial Africa'; 'Russia and the Trans-Siberian Railway'; 'American Commerce'; 'Commercial Alaska'; 'Submarine and Land Telegraphs of the World'; 'Colonies of the World and Their Government'; 'Colonial Administration'; etc. He is associate editor of the 'National Geographic Magazine.'

Aus'tin, Stephen Fuller, American pioneer: b. 1792; d. 27 Dec. 1836. He was a son of Moses Austin (q.v.), followed up the grant previously issued to his father. By it he was clothed with almost absolute power over the colonists, and only obliged to report to the captain-general. He founded what is now the city of Austin, the capital of Texas. The colony prospered, and, being accompanied

by a considerable number of similar associations, promoted an influx of Americans to such an extent that they met 1 March 1833, without the concurrence of the Mexican population, in a convention to form a constitution for the as yet Mexican state of Texas. Austin was one of the delegates chosen to carry the result of their deliberations to the central government at Mexico, and obtain its ratification. The delays and frequent revolutions at Mexico leading him to despair of ever bringing his commission to a close, he addressed a letter, 2 Oct. 1833, to the municipality of Bexar, and through them to the people of Texas, recommending a union of all the municipalities to provide against the consequences of a probable refusal of their applications by organizing a state under the *Acta constitutiva* of 7 May 1824. This letter was considered treasonable, and Austin was arrested and held as a hostage for the good behavior of Texas. There he was detained until September 1835. He was appointed a commissioner to the United States in November 1835. This was before the Texan declaration of independence; and it was not till after his arrival at New Orleans, and the information of the union of Santa Anna with the federal party for the invasion of Texas, that he was brought to the point of recommending such a measure. He acted with prudence and patience, and was successful in preparing for the independence and annexation of the new republic. He is looked upon as one of the most eminent and honorable of the founders of Texan prosperity.

Aus'tin, William, American author: b. 1778; d. 1841; remembered for his striking and original tale, 'Peter Rugg, the Missing Man,' in effect a New England variant of the Wandering Jew legend.

Aus'tin, Minn., a city and county-seat of Mower County, situated on Red Cedar River, and on the Chicago G. W., and the Chicago, M. & St. P. R.R.'s. It is the centre of a fertile agricultural region, and has a large export trade, as well as a variety of manufacturing establishments, including a meat-packing factory, flour mills, cement works, railroad shops, brick works, creamery, etc. It is the seat of the Southern Minnesota Normal College, and has several fine public buildings, among them a Carnegie library. Austin was first settled in 1852. Pop. (1900) 5474.

Aus'tin, Tex., the capital and county-seat of Travis County, on the Colorado River. It is 81 miles north-northeast of San Antonio by the International & G. N. R.R., 186 miles west by north of Houston, and 230 miles northwest of Galveston, by the same, and the Houston & T. C. R.R.; and on the Austin & N. W. R.R. It is beautifully situated about 40 feet above the river, which here flows through attractive scenery, is navigable for river steamers in the winter, and is spanned by two bridges. An immense dam, 1,275 feet long by 67 feet above bed rock, the twelfth longest in the world, was completed in 1892, for water supply and power; but was carried away by a flood 7 April 1900. During its existence it created a large and handsome sheet of water called Lake McDonald, a favorite resort for fishing, hunting, and health-seeking parties, and famous for having two international regattas on it, Stansbury of Australia winning the championship of the world. There

AUSTRALASIA—AUSTRALIA

are manufactories of lumber and iron goods, flour and leather; and oil refineries. There is a very large export trade in agricultural produce and live stock, hides and wool, cotton and grain; it is also the wholesale supply centre for a great district in provisions, dry goods, drugs, agricultural implements, ranching supplies, etc. The city is well built with wide and well-shaded streets. The most prominent building is the capitol, one of the largest of such structures in the United States, built of granite at a cost of \$3,500,000. There are also the main building of the State University, which accommodates the law and literary departments; State asylums for the insane, blind, and deaf-mutes, and for colored patients of these classes; the State Confederate Home; St. Edward's College; the Tillotson Institute for Colored Pupils; seminaries and academies, besides the public school system. The State land office and the county court-house are prominent buildings. The government is administered under the revised charter of 1901, is by mayor, biennially elected; a city council, chosen half by wards and half at large; and officials elected partly by the council and partly by popular vote. The city owns its own waterworks and electric plant. The settlement was first called Waterloo, but in 1837, after the Texan revolution, incorporated and re-named after Stephen F. Austin (q.v.), the county being likewise named from William B. Travis (q.v.), killed at the Alamo. It was made the capital in 1839, and remained such after the admission of Texas as a State. The first free school in the State was established here in 1871. Pop. (1900) 22,258.

Australasia, às'trāl-ā'shīa, a geographical term of loose application, but usually regarded as comprehending the continental island of Australia and an unascertained number of other islands, some of them very little known, lying between lon. 110° and 180° E., and stretching from Papua or New Guinea, the farthest northern island of the division, to lat. 50° S. Besides the great island of Australia, it thus includes Tasmania, New Zealand, the Loyalty Islands (New Caledonia, etc.), Norfolk Island, New Hebrides, Solomon Islands, New Ireland (Neu-Mecklenburg), New Britain (Neu-Pommern), Admiralty Islands, and New Guinea, besides numerous other islands and island groups. The island of Timor and those lying west of it, though coming within the general boundary above indicated, belong to the Eastern or Indian Archipelago, called also Malasia. Australasia is estimated to have an area of 3,740,000 English square miles, and a population of 6,400,000. It forms one of three portions into which some geographers have divided Oceania, the other two being Malasia and Polynesia. Consult A. R. Wallace, 'Australasia.'

Austra'lia, an island continent of the southern hemisphere, southeast of Asia; between lat. 10° 41' and 39° 11' S.; lon. 113° 5' and 153° 16' E. Its greatest length from west to east is 2,400 miles; greatest breadth, 1,700 to 1,900 miles. It comprises the states of the Commonwealth of Australia, whose federation was proclaimed 1 Jan. 1901.

Area and Population.—The area and the population (exclusive of aborigines) of the different states composing the Commonwealth of Australia in 1901 were as follows:

Original States	Area. Sq. M.	Pop.
New South Wales.....	310,367	1,352,297
Victoria	87,884	1,200,918
Queensland	668,497	496,596
South Australia	903,690	362,604
Western Australia.....	975,920	184,553
Tasmania.....	26,215	172,475
Total..	2,972,573	3,767,443

Topography.—While there are many spacious harbors on the coast, there are few great indentations; the principal being the Gulf of Carpentaria, on the north, the Great Australian Bight, and Spencer Gulf, on the south. The chief projections are Cape York Peninsula and Arnhem Land in the north. Parallel to the north-east coast runs the Great Barrier Reef, extending for 1,000 miles. In great part the east coast is bold and rocky, and fringed with many small islands. Part of the south coast is low and sandy, and part presents cliffs several hundred feet in height.

Geology.—The interior, so far as explored, is largely composed of rocky tracts and barren plains with little or no water. The whole continent forms an immense plateau, highest in the east, low in the centre, and with a narrow tract of land usually intervening between the elevated area and the sea. The base of the table-land is granite, which forms the surface rock in a great part of the southwest, and is common in the higher grounds along the east side. Secondary (cretaceous) and Tertiary rocks are largely developed in the interior. Silurian rocks occupy a large area in south Australia, on both sides of Spencer Gulf. The mountainous region in the southeast and east is mainly composed of volcanic, silurian, carbonaceous, and carboniferous rocks, yielding good coal. No active volcano is known to exist, but in the southeast there are some craters only recently extinct. The highest and most extensive mountain system is a belt about 150 miles wide, skirting the whole eastern and southeastern border of the continent, and often called, in whole, or in part, the great dividing range, from forming the great water-shed of Australia. A part of it, called the Australian Alps, in the southeast contains the highest summits in Australia, Mount Kosciusko (7,175 feet), Mount Clark (7,256), and Mount Townshend (7,353). West of the dividing range are extensive plains or downs admirably adapted for pastoral purposes. The deserts and scrubs, which occupy large areas of the interior, are a characteristic feature of Australia. The former are destitute of vegetation, or are clothed only with a coarse, spiny grass that affords no sustenance to cattle or horses; the latter are composed of a dense growth of shrubs and low trees, often impenetrable till the traveler has cleared a track with his axe.

Water Courses.—The rivers of Australia are nearly all subject to great irregularities in volume, many of them at certain seasons showing a channel in which there is merely a series of pools, while at others they inundate the whole adjacent country. The chief is the Murray, which, with its affluents, the Murrumbidgee, Lachlan and Darling, drains a great part of the interior west of the dividing range, and falls into the sea on the south coast (after entering Lake Alexandrina). Its greatest tributary is

AUSTRALIA

the Darling, which may even be regarded as the main stream. On the east coast are the Hunter, Clarence, Brisbane, Fitzroy, and Burdekin; on the west the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the north the Fitzroy, Victoria, Flinders, and Mitchell. The Australian rivers are of little service in facilitating internal communication. Many of them lose themselves in swamps or sandy wastes of the interior. A considerable river of the interior is Cooper's Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the south side of the continent having no outlet, and, accordingly, salt. The principal of these are lakes Eyre, Torrens, and Gairdner, all of which vary in size and saltiness according to the season. Another large salt lake of little depth, Lake Amadeus, lies a little west of the centre of Australia. Various others of less magnitude are scattered over the interior.

Climate.—The climate of Australia is generally hot and dry, but very healthy. In the tropical portions there are heavy rains, and in most of the coast districts there is a sufficiency of moisture, but in the interior the heat and drought are extreme. Considerable portions now devoted to pasturage are liable, at times, to suffer from drought. At Melbourne the mean temperature is about 56°, at Sydney about 63°. The southeast settled districts are at times subject to excessively hot winds from the interior, which cause great discomfort, and are often followed by a violent cold wind from the south ("southerly bursters"). In the mountainous and more temperate parts snow storms are common in June, July, and August.

Mineralogy.—Australia is a region containing a vast quantity of mineral wealth. Foremost come its rich and extensive deposits of gold, which, since the precious metal was first discovered, in 1851, have produced a total of more than \$1,350,000,000. The greatest quantity has been obtained in Victoria, but New South Wales and Queensland have also yielded a considerable amount. Probably there are rich stores of gold as yet undiscovered. Australia also possesses silver, copper, tin, lead, zinc, antimony, mercury, plumbago, etc., in abundance, besides coal, which is now worked to a considerable extent in New South Wales, and iron. Various precious stones are found, as the garnet, ruby, topaz, sapphire, and even the diamond. Of building stone there are granite, limestone, marble, and sandstone.

Plant Life.—The Australian flora presents peculiarities which mark it off by itself in a very decided manner. Many of its most striking features have an unmistakable relation to the general dryness of the climate. The trees and bushes have, for the most part, a scanty foliage, presenting little surface for evaporation, or thick leathery leaves well fitted to retain moisture. The most widely spread types of Australian vegetation are the various kinds of gum trees (*Eucalyptus*), the she-oak (*Casuarina*), the acacia or wattle, the grass tree (*Xanthorrhæa*), many varieties of *Proteaceæ*, and a great number of ferns and tree ferns. Of the gum tree there are found upward of 150 species, many of which are of great value. Specimens of the peppermint (*Eucalyptus amygdalina*) have been found to measure from 480 to 500 feet in height. As timber trees the most valuable members of this genus are the *E. ros-*

trata (or red gum), *E. leucoxylon*, and *E. marginata*, the timber of which is hard, dense, and almost indestructible. A number of the gum trees have deciduous bark. The wattle or acacia includes about 300 species, some of them of considerable economic value, yielding good timber or bark for tanning. The most beautiful and most useful is the golden wattle (*Acacia dealbata*), which in spring is adorned with rich masses of fragrant yellow blossom. Palms,—of which there are 24 species, all except the cocoa-palm peculiar to Australia,—are confined to the north and east coasts. In the "scrubs" already mentioned hosts of densely intertwisted bushes occupy extensive areas. The mallee scrub is formed by a species of dwarf eucalyptus, the mulga scrub, by a species of thorny acacia. A plant which covers large areas in the arid regions is the spinifex or porcupine grass, a hard, coarse and excessively spiny plant, which renders traveling difficult, wounds the feet of horses, and is utterly uneatable by any animal. Other large tracts are occupied by herbs or bushes of a more valuable kind, from their affording fodder. Foremost among those stands the salt-bush (*Atriplex nummularia*, order *Chenopodiaceæ*). Beautiful flowering plants are numerous. Australia also possesses great numbers of turf-forming grasses, such as the kangaroo grass (*Anthistiria australis*), which survives even a tolerably protracted drought. The native fruit trees are few and unimportant, and the same may be said of the plants yielding roots used as food; but exotic fruits and vegetables may now be had in the different colonies in great abundance and of excellent quality. The vine, the olive, and mulberry thrive well, and quantities of wine are now produced. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugar-cane.

Animal Life.—The Australian fauna is almost unique in its character. Its great feature is the total absence of all the forms of mammalia which abound in the rest of the world, their place being supplied by a great variety of marsupials—these animals being nowhere else found, except in the opossums of America. There are about 110 kinds of marsupials, of which the kangaroos, wallabies, wombat, koala, bandicoot, phalangers, opossums, and the fierce carnivorous dasyures are the best-known varieties; a wild dog (see DINGO) is common. Two extraordinary animals, the platypus, or water mole of the colonists (*Ornithorhynchus*), and the porcupine ant-eater (*Echidna*) constitute the lowest order of mammals (*Monotremata*), and are confined to Australia. Their young are produced from eggs. Australia now possesses a large stock of the domestic animals of England, which thrive there remarkably well. The breed of horses is excellent. Horned cattle and sheep are largely bred, the first attaining a great size, while the sheep improve in fleece and their flesh in flavor.

The birds of Australia are numerous and in great variety, all the more important orders and families of class *Aves* being represented. Eagles, some very large, measuring about 7 feet across the wings; falcons, and various species of hawks and owls, are numerous; and so also are parrots and cockatoos, many of them of the most beautiful plumage. Pigeons of various species, and the most delicate and

AUSTRALIA

varied hues, frequent sundry parts of the island. The largest Australian bird is the emu, which, though excelled in size by the ostrich, attains a height sometimes of more than seven feet, five and six being the average. It is widely diffused, but is rapidly disappearing from the more settled districts. The lyre bird with its magnificent lyre-shaped tail, the interesting bower birds, and the mound-building talegalla and megapodius, are natives of this land of peculiar natural productions. The gigantic jabiru stork may be seen on the borders of the rivers, lakes, or swamps, which also abound in the duck tribe. Other aquatic birds are the pelican, Australian goose, and that *rara avis* of the Latin writers, the black swan. The game birds,—pigeons, ducks, quail, geese, etc.,—are numerous. The number of species is about 650. There are many reptiles, the largest being the alligator, found in some of the northern rivers. There are upward of 60 different species of snakes, some of which are very venomous. Lizards, frogs and insects are also numerous in various parts. The seas, rivers and lagoons abound in fish of numerous varieties, and other aquatic animals, many of them peculiar. Whales and seals frequent the coasts. On the north coasts are extensive fisheries of trepang, much visited by native traders from the Indian Archipelago. Some animals of European origin, such as the rabbit and the sparrow, have developed into real pests in several of the colonies in recent years.

Peoples.—The natives belong to the Australian negro stock, and are sometimes considered the lowest as regards intelligence in the whole human family, though this is doubtful. They are believed to number about 31,000, exclusive of those in the unexplored parts. They are of a dark-brown or black color, with jet-black curly, but not wooly, hair, of medium size, but inferior muscular development. In the settled parts of the continent they are inoffensive, and rapidly dying out. They have no fixed habitations; in the summer they live almost entirely in the open air, and in the more inclement weather they shelter themselves with bark erections of the rudest construction. They have no cultivation and no domestic animals. Their food consists of such animals as they can kill, and no kind of living creature seems to be rejected, snakes, lizards, frogs, and even insects being eaten, often half raw. They are ignorant of the potter's art. In their natural condition they wear little or no clothing. They speak a number of different languages or dialects. The women are regarded merely as slaves, and are frightfully maltreated. They have no religion; they practice polygamy, and are said to sometimes resort to cannibalism, but only in exceptional circumstances. They are occasionally employed by the settlers in light kinds of work, and as horse-breakers; but they dislike continuous occupation, and soon give it up. The weapons of all the tribes are generally similar, consisting of spears, shields, boomerangs, wooden axes, clubs, and stone hatchets. Of these the boomerang is the most singular, being an invention confined to the Australians.

Government.—In addition to the central federated government (see AUSTRALIAN FEDERATION), each of the colonies has a governor, administration, and a legislature of its own. The governors are appointed by the Crown, and all

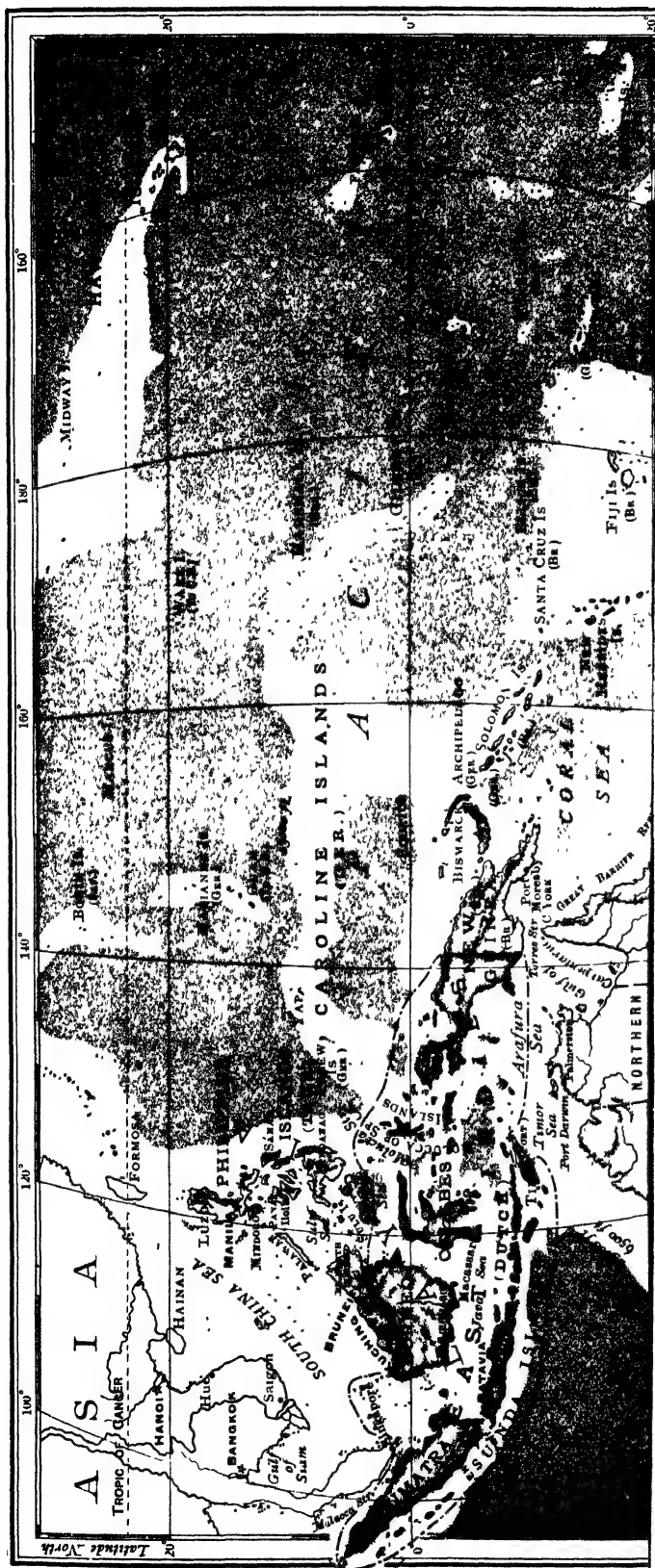
acts passed by the colonial legislatures must receive the royal assent. Each legislature consists of two houses, a Legislative Council and a Legislative Assembly, the lower house being elected by manhood suffrage. The aggregate annual revenue of the colonies is about \$100,000,000, the annual expenditure several millions more. The public debt is over \$500,000,000. The colonies have a considerable defensive force of militia and volunteers, also a number of gun-boats, torpedo-boats, etc., besides which there is always a squadron of British men-of-war on the Australian station. There is no established Church in any of the colonies. The denomination which numbers most adherents is the English or Anglican Church, next to which come the Roman Catholics, Presbyterians, and Methodists. Education is well provided for, instruction in the primary schools being, in some cases, free and compulsory, and the higher education being more and more attended to. There are flourishing universities in Melbourne, Sydney, and Adelaide. Newspapers are exceedingly numerous, and periodicals of all kinds are abundant. There is, as yet, no native literature of any distinctive type, but names of Australian writers of ability, both in prose and poetry, are beginning to be known beyond their own country.

Industrial Pursuits.—Pastoral and agricultural pursuits and mining are the chief occupations of the people, though manufactures and handicrafts also employ large numbers. For sheep rearing and the growth of wool the Australian colonies are unrivaled, and, while the production of gold has considerably decreased, that of wool is constantly on the increase. The great bulk of the wool exported goes to Great Britain, which, in recent years, has received over 300,000,000 pounds from the Australian colonies annually. The commerce is rapidly extending, and becoming, every year, more important to England, whence the colonists derive their chief supplies of manufactured goods in return for wool, gold, and other produce. Next to wool come the minerals, wheat, preserved meat, and tallow, hides and skins, cotton, tobacco, sugar, and wine as the most important items of export.

Gold Mining.—The mineral wealth of Australia has been the most important factor in the building up of the country. Gold was discovered in 1823, but it was nearly 30 years later before its full importance was realized. During 50 years, until 1900, the gold mined approximated in value to \$2,000,000,000, and gold mining is still the most important industry, after wool raising. The official figures for 1902 are as follows:

State	Gross Weight of Gold Ounces	Value
Victoria.....	784,746	\$15,056,951
New South Wales.....	300,289	5,259,582
Queensland.....	857,713	12,885,903
South Australia.....	29,112	489,083
West Australia.....	2,177,447	36,571,747
Tasmania.....	66,500	1,260,424
Total.....	4,215,801	\$71,523,690

The chief imports consist of textile fabrics, haberdashery, and clothing, machinery and metal goods. The aggregate imports, in 1897, were \$327,997,650 in value, the exports \$361,052,-



AUSTRALIA

630. There are upward of 12,000 miles of railway in actual use, or in course of construction, and about 35,000 miles of telegraph. The longest telegraph line is that running northward across the continent from Adelaide. The two chief routes for mails between Great Britain and the Australian colonies are by way of the Suez Canal, and by San Francisco across the American continent. The coinage is the same as in the mother country. Banks and banking offices are numerous, including post-office or other savings banks for the reception of small sums.

History.—It is doubtful when Australia was first discovered by Europeans. Between 1531 and 1542 the Portuguese published the existence of a land which they called Great Java, and which corresponded to Australia, and probably the first discovery of the country was made by them early in the 16th century. The first authenticated discovery is said to have been made in 1601, by a Portuguese named Manoel Godinho de Eredia. In 1606, Torres, a Spaniard, passed through the strait that now bears his name, between New Guinea and Australia. Between this period and 1628, a large portion of the coast line of Australia had been surveyed by various Dutch navigators. In 1664 the continent was named New Holland by the Dutch government. In 1688 Dampier coasted along part of Australia, and about 1700 explored a part of the west and northwest coasts. In 1770 Cook carefully surveyed the east coast, named a number of localities, and took possession of the country for Great Britain. He was followed by Bligh in 1789, who carried on a series of observations on the northeast coast, adding largely to the knowledge already obtained of this new world. Colonists had now arrived on the soil, and a penal settlement was formed (1788) at Port Jackson. In this way was laid the foundation of the future colony of New South Wales. The Moreton Bay district (Queensland) was settled in 1825; in 1835 the Port Philip district. In 1851 the latter district was erected into a separate colony under the name of Victoria. Previous to this time the colonies both of Western Australia and of South Australia had been founded—the former in 1829, the latter in 1836. The latest of the colonies is Queensland, which only took an independent existence in 1859. The discovery of gold in abundance took place in 1851, and caused an immense excitement and great influx of immigrants. The population was then only about 350,000, and was slowly increasing; but the discovery of the precious metal started the country on that career of prosperity which has since been almost uninterrupted. Convicts were long sent to Australia from the mother country, but transportation to New South Wales practically ceased in 1840, and the last convict vessel to West Australia arrived in 1868. Altogether about 70,000 convicts were landed in Australia (besides almost as many in Tasmania).

Exploration.—For 25 years after the establishment of a colony on the shores of Port Jackson, settlement was confined to the narrow strip of country shut in on the northwest and south by the Blue Mountains beyond which no one had penetrated, though many attempts to do so had been made. Along the sea the colony extended from Jervis Bay to Port Stephens, a distance of 165 miles. In 1813

the mountain barrier was successfully crossed by Messrs. Blaxland, Lawson, and Wentworth, and the plains beyond were at once occupied. In 1815 a practicable road was made across the mountains, and exploration was thereafter pushed on with the greatest vigor. In 1817 Oxley discovered and traced the Lachlan for some hundred miles, and later he discovered the Macquarie and other streams. In 1819 the Murrumbidgee was discovered. In 1824 Messrs. Hovell and Hume crossed the district now forming the colony of Victoria and reached the head of Port Phillip. Allan Cunningham, the botanist, made extensive explorations in 1823 and subsequent years, and the celebrated Capt. Sturt commenced his arduous and wonderful undertakings about the same time, nor should the names of Hume and George Macleay be forgotten. Major Mitchell continued the work, joining skill and science to much energy and good fortune. Meanwhile the survey of the coast begun by Flinders was ably continued by Capt. Parker King and others. The northwest coasts were next examined by explorers, but with little result. From Sydney the centre of exploration was moved to Adelaide, and from that city several famous expeditions set out. It was from Adelaide that Eyre started on most of his journeys, and from there also that Capt. Sturt began his survey of the lower Murray and Darling in 1844. Much exploration was done in Queensland about this time by Dr. Leichhardt under the auspices of the government of New South Wales. Leichhardt lost his life in 1848 in an attempt to cross the continent to the west coast. Very extensive discoveries were made by Messrs. A. C. and F. T. Gregory in the fifties, and in 1862 John M'Douall Stuart, after several gallant attempts, crossed the continent from Adelaide to the north coast and returned to the point of starting. In 1860–61 a well-equipped expedition left Melbourne to cross the continent; it was under the command of R. O'Hara, Burke, and W. J. Wills, astronomical and meteorological observer. The disastrous end of the expedition is well known. Several relief expeditions were fitted out to find traces of the Burke and Wills party and it fell to A. W. Hewitt to discover the sole survivor, King, who had been preserved from starvation by the kindly aid of the natives. Australia has never wanted for explorers, and from 1860 onward, a year has scarcely passed that an expedition of some kind has not been at work.

Bibliography.—Calvert, 'Discovery of Australia'; 'Exploration of Australia'; Dawson, 'Australian Aborigines'; Favenc, 'History of Australian Exploration'; Finney, 'History of the Australian Colonies'; Kent, 'The Naturalist in Australia'; Parkes, 'Fifty Years in the Making of Australian History'; Ranken, 'The Federal Geography of British Australasia'; 'The Dominion of Australia'; Reclus, 'The Earth and Its Inhabitants, Oceanica'; Rowland, 'The Economic Resources of the Australian Commonwealth' (Economic Review, Vol. XII.); Rusden, 'History of Australia'; Tate, 'A Century of Geological Progress in Australia'; Thomson, 'The Physical Geography of Australia' (Smithsonian Report 1896); Trollope, 'Australia and New Zealand'; Wallace, 'The Rural Economy and Agriculture of Australia and New Zealand'; Year-book of Australia.

AUSTRALIA

Australia, South, one of the original states in the Commonwealth of Australia. It occupies the middle of Australia, and at first, as the colony of South Australia, extended between lon. 132° and 141° E., and from the Southern Ocean to lat. 26° N., having then an area of about 300,000 square miles. In 1861 a district lying to the west of the colony was added to it, so that its western boundary was shifted to the meridian of 129°. In 1863 it received in addition the country between its northern boundary and the opposite coast (this portion being now known as the Northern Territory), so that South Australia now possesses a territory extending across Australia, and occupying an area estimated at 903,690 square miles. It is bounded on the east by Victoria, New South Wales, and Queensland; on the west by Western Australia. Its greatest length from north to south is 1,850 miles, and its width 650 miles. The south coast, for the first 120 miles east of where it begins at Port Eucla, is backed by steep limestone ranges from 400 to 600 feet in height, but as a whole the coast is low and desolate-looking. In a straight line from Port Eucla on the west to Cape Northumberland, near the boundary of Victoria, the distance is 850 miles, but the coast-line between these points extends to nearly twice that distance, owing to the indentations of Spencer Gulf and the Gulf of St. Vincent. Opposite the latter is Kangaroo Island, the largest island on the Australian coast, excepting Tasmania. The coast of the Northern Territory is thickly strewn with islands, three of which are of large size. There are also some excellent ports, one of these, Port Darwin, where the overland telegraph and the cable from Batavia and the East meet, being among the finest harbors in Australia. On the eastern side of the Gulf of St. Vincent lie the most populous portions of the state, and here is situated Adelaide, the state capital.

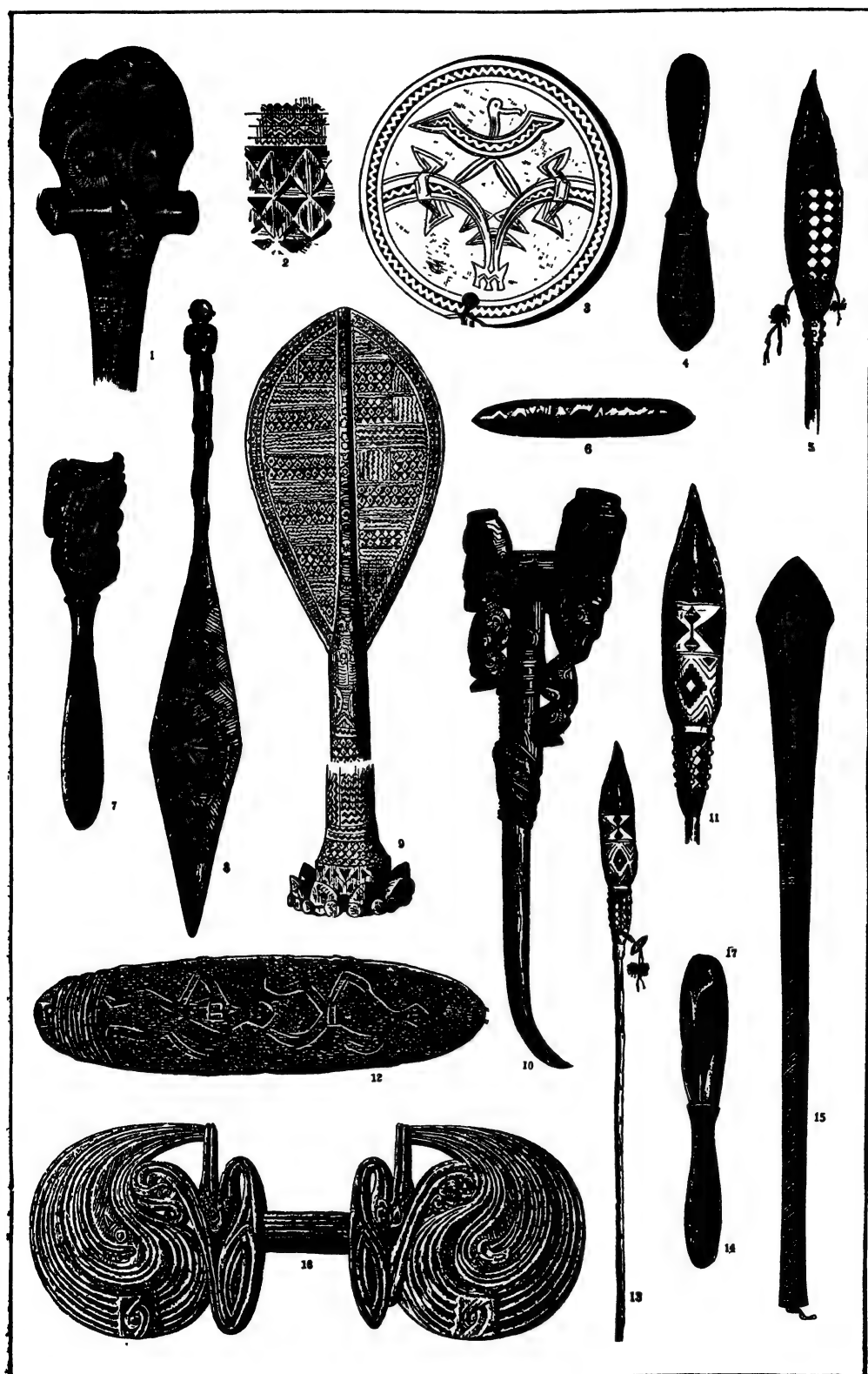
The interior formation of South Australia widely differs from that of the more eastern states. The mountains here run from the sea to the interior, ending somewhat abruptly among the lakes. The principal chain, the Mount Lofty range, begins at Cape Jervis, and follows the shore of the Gulf of St. Vincent past Adelaide, meeting at the head of the gulf, the ridges forming the backbone of Yorke Peninsula. The range still running north is called Flinders range, and ends in a wide mass of mountain 3,000 feet high, separating the lakes Torrens, Eyre, Frome, and Blanche. All these so-called lakes are huge expanses of salt water, swamp, and mud. On the west of Spencer Gulf is Eyre Peninsula, through the heart of which runs the Gawler range, attaining an elevation of 2,000 feet, and ending on the shores of another series of lakes of the same character as Lake Torrens. The principal summits of the Mount Lofty range are Razor-back, in latitude 33° 20', and immediately north of it Mount Bryan, close to which is the celebrated Burra-Burra copper mine. The highest peaks of the Flinders range are Mount Remarkable, 3,179 feet, Brown 3,174 feet, and Arden 3,000 feet. None of the peaks in the Gawler range attain more than a moderate elevation. On the left bank of the Murray, and near its mouth, a range of moderately elevated heights proceed south-southeast, skirting the coast to its extremity near Cape Northumberland. Throughout these ranges the exist-

ence of volcanic agency at a former period is everywhere apparent. The Warburton range and the Stuart ranges lie beyond and to the north and west of the lakes; further north on the Tropic of Capricorn, are the MacDonnell ranges, rising to a height of 4,000 feet, from which the extreme western affluents of the Lake Eyre River system take their rise. The other portions of the territory to the north and west are almost level, and consist of either waterless plains or plains of sandstone boulders, with desert grass and spinifex.

Among the mountains east of Gulf of St. Vincent, primitive limestone, often in the form of a beautiful white marble, is very abundant. There are indications of a large variety of minerals throughout the state, but copper is the only one that has been met with in large quantities, the total production to the end of 1899 being valued at £23,000,000. Gold has been found in various places, but the quantity won has been small. In the Northern Territory gold has also been found over a considerable tract of country, and good progress has been made in mining, while other minerals are known to exist. Almost the only stream within the state proper, which deserves the name of river, is the Murray, which enters the colony on the east in latitude 34°, and flows first circuitously west and then south, into the extensive lagoon called Lake Alexandrina, communicating with the sea by a narrow opening. During the rainy season it is navigable by steamers through its whole course within the state, and for 1,500 miles in New South Wales. In the Northern Territory the Roper River is a fine large stream, navigable for sea-going vessels for 100 miles from its mouth in the Gulf of Carpentaria; the Victoria is also navigable. The climate of South Australia proper greatly resembles that of Sicily and Naples. During nine months of the year it is agreeable, the disagreeable portion of the year being the three summer months of December, January, and February, when the natural heat of the season is greatly increased by hot winds from the interior. What is called winter would be considered in England merely a wet autumn. There are no epidemic diseases. Scrofulous and tubercular diseases are rare, but diseases of the eyes are common in summer, being either occasioned by the impalpable dust floating in the atmosphere, or by exposure to the night air after the glare of the sun.

South Australia produces nearly all the fruits and vegetables that are cultivated in Europe, as well as others, but in temperate regions is chiefly distinguished as a wheat and grape-growing country. Besides supplying its own wants, it sends large quantities of wheat to the neighboring states and to Europe, where "Adelaide" wheat is held in high estimation. The area under wheat is about 1,750,000 acres. The quantity produced varies greatly with the season, but the average production is six bushels per acre. The area under vineyards is gradually extending, and now approaches 20,000 acres. Brandy is produced as well as wine. Hop-growing is attracting some attention, and the olive is also cultivated. The value of the exports of the state is £7,100,000, and of the imports £7,300,000, total £14,400,000. The chief exports are wool, wheat, flour, copper, and copper ore, skins, etc. The value of the wool exported is generally about £1,000,000, and of

ABORIGINAL AUSTRALIAN AND AUSTRALASIAN ART.



AUSTRALIA—AUSTRALIAN BALLOT

wheat and flour from £800,000 to £1,500,000, according to the season. The trade of a large part of New South Wales passes through South Australia. The revenue and expenditures are each about £2,700,000. The length of railways is 1,890 miles. There is a complete system of telegraphs, besides the great line from Adelaide across the continent to Port Darwin, a distance of 2,000 miles. The public debt of the state is £24,309,035, and has been mostly incurred for reproductive public works. See AUSTRALIA; AUSTRALIAN FEDERATION.

Australia, Western, one of the original states in the Commonwealth of Australia. It includes that portion of Australia west of lon. 129° E, and is bounded, east by South Australia, and northwest, and south by the Indian Ocean. It lies between the parallels of 13° 30' and 35° 8' S.; greatest length, 1,450 miles north to south; greatest breadth, 850 miles; area, 975,920 square miles. The coast-line measures about 3,000 miles, and, except on the south is indented by numerous bays, creeks, and estuaries. The coast is fringed by many islands, but none of any importance. The principal inlets are Cambridge Gulf, Admiralty Gulf, York Sound, Collier Bay, King Sound, Roebuck Bay, Exmouth Gulf, Shark Bay, Geographe Bay, and King George Sound, the last the most important as having Albany on its shore, the port of call for the European mail steamers. The chief rivers are the Ord and Fitzroy on the north, De Grey, Ashburton, Fortescue, Gascoign, Murchison, Greenough, Swan, and Blackwood on the west. The Swan River is important, as Perth, the capital, is situated on its banks. Some of the rivers within the tropics are large and navigable, but few of the others run all the year, and fewer still are navigable even for boats to any great distance. The interior was till recent years not well known, but at present there is little territory which has not been explored. The country is chiefly an alternation of ridges and hollows, sandy, without grass, and clothed with bushes and scrubby timber, without the trace of a water-course. The really settled and occupied portion of the state forms only a mere fraction of its whole area. The population is mostly collected in the southwest corner, where the first settlements were made, and around the recently discovered gold reefs. Scattered settlements stud the coast at various points. On the west coast are extensive banks covered with the pearl oyster, which give employment to a fleet of boats. The Kimberley district in the north is a region of great promise; it comprises 20,000,000 acres of well-watered land intersected by the Fitzroy River and other large streams, and is said to be admirably adapted for pastoral purposes, besides having a large area suitable for the cultivation of sugar, coffee, and rice. The greater part of the seaboard, except along the Australian bight, is separated from the interior by a low range of hills running parallel to it, and covered with forests. The fertile land exists in patches, and some of it is of a very rich character. The principal crops are wheat, barley, hay, and potatoes; the vine is also successfully cultivated, and excellent wine is made in the colony. The area under cultivation comprises about 140,000 acres, of which wheat occupies 42,000 acres, hay 84,000 acres, vines 2,750 acres. The live stock in 1899 numbered

2,210,000 sheep, 245,000 cattle, 62,000 horses, besides a large number of camels, pigs, goats, and poultry. An available area of 1,000 square miles is covered with jarrah forests. The jarrah is a species of eucalyptus (*E. marginata*); its timber is in great request for railway sleepers, for building purposes, and especially for marine constructions, having the valuable property of resisting the attacks of the white ant on land and the ship worm at sea. Considerable areas in the southwest are covered with karri (*E. diversicolor*). There are also numerous forests of sandalwood trees, the timber of which is exported in large quantities, chiefly to China for incense purposes. Flowers and fruits from all quarters of the globe grow luxuriantly. Among the fruits successfully cultivated are apples, pears, oranges, peaches, plums, apricots, figs, almonds, bananas, olives, etc. English vegetables may be profitably cultivated at almost all seasons. Bees thrive and produce abundant stores of honey.

The mineral resources of the state are not yet fully known. Gold has been discovered in large quantities, and Western Australia is now the chief gold-producing state of Australia, the Coolgardie gold fields being among the most productive. In 1899 the gold exported had the value of £6,246,731. Lead and copper exist abundantly, and several mines are in operation. Iron ore might be raised in almost inexhaustible quantities, and tin also exists. The gold discoveries have formed an epoch in the history of the state, and trade and population have recently increased very rapidly. The imports, which in 1887 were valued at £830,000, amounted in 1899 to £4,474,000, the exports in the latter year being £6,985,000. Besides gold the exports include wool, jarrah and karri timber, sandalwood, pearls, pearl shells, tin ore, skins, etc. The revenue has grown enormously. In 1881 it was £206,205; in 1891, £497,670; and in 1898, £2,754,747. The public debt is £9,203,738, equal to £53 16s. 8d. per inhabitant. There are about 1,400 miles of railway open. The principal towns are Perth, the capital, and Fremantle, which is the chief port. The first part of the state settled was the southwest corner, long known as the Swan River Settlement, established in 1829. From 1850 to 1868 it was a place for the transportation of convicts. In 1890 the state received a system of responsible government similar to that prevailing in the other colonies of Australia.

Australian Alps, a range of mountains in the southeast of Australia, extending over a length of about 400 miles. The highest peaks are in New South Wales, and the highest, according to Lendenfeld, is Mount Townshend (7,353 feet), belonging to a group which he calls the Kosciusko group. The peaks next in height belong to the Bogong group in Victoria, and the west of the Mitta Mitta, the highest of which is Mount Bogong (6,508 feet). They do not reach the snow line, though snow lies in the higher valleys all the summer. Geologically, the Australian Alps are composed mainly of very ancient metamorphic rocks, which have been worn down in the course of ages to tablelands, and which slope down rather steeply on all sides. Volcanic rocks cover the table-land to the south of Mount Bogong.

Australian Bal'lot. See BALLOT.

AUSTRALIAN FEDERATION — AUSTRIA

Australian Federation, the political union of the five Australian colonies, together with Tasmania. The first convention looking to this end was held at Hobart in January 1886. The colonies represented were Victoria, Queensland, Tasmania, Western Australia, and Fiji. Another conference took place in 1891, at Sydney, New South Wales, attended by delegates from each of the colonies. A plan of federal government was proposed, resembling in many of its features that of the United States. A draft bill to constitute the Commonwealth of Australia was adopted by the convention, and it was agreed to submit it to the approval of the individual legislatures of the several colonies. This bill met with success in the lower branch of but one colonial legislature—that of Victoria. In January 1895 there was a conference of premiers of five colonies at Hobart, and the Legislative Assembly of New South Wales passed a federal enabling act in November of that year, and notice of motion was given in other legislatures to bring in a similar bill. The first practical step was taken in 1898. A convention of representatives of New South Wales, Victoria, Tasmania, South Australia, and Western Australia, succeeded in drafting a constitution, which was submitted to the popular vote of each of those colonies in June. The constitution provided for a governor-general, appointed by the Crown; a federal parliament, composed of the Crown, represented by the governor-general, a Senate, and a House of Representatives. The powers of the parliament were set forth in 39 articles, and covered trade with other countries, taxation, coinage, weights and measures, foreign corporations, pensions, arbitration, etc. Free trade between the states was recognized. By the terms of the plebiscite, an affirmative vote of substantially one third of the electors of New South Wales, and of one fifth of the electors of each of the other colonies, was required to adopt this constitution. But the election returns in June were fatal to the scheme. While the majorities in the four lesser colonies were overwhelmingly in favor of the constitution, the requisite affirmative vote in New South Wales was not obtained.

On 2 Feb. 1899, a unanimous agreement was reached by the colonial premiers in conference at Melbourne, regarding the unsettled questions referred to them by the colonial legislatures, thus insuring the success of the federation project. In 1900, a bill making federation effective was introduced into Parliament, at London, and passed, the only amendment offered having reference to the royal prerogative. Later in that year the Earl of Hopetoun was appointed by the queen first governor-general. He resigned in May 1902.

Austrasia, âs-trá'shîa (the East Kingdom), the name given, under the Merovingians, to the Eastern possessions of the Franks, embracing Lorraine, Belgium, and the right bank of the Rhine. These districts, thickly inhabited by Franks, were of great importance at the time of the rise of the Frankish power.

Aus'tria (from the German OESTREICH or OESTERREICH, eastern empire), or AUSTRIA-HUNGARY, the collective designation of several states of central Europe, consisting of two semi-independent countries, each with its own parliament and government, but with one common

sovereign, army, and system of diplomacy, and also with a common parliament.

History of the Country till the Year 982—

After the Romans had vanquished the Noricans, 33 A.D., and gained possession of the Danube, the country north of the Danube, extending to the borders of Bohemia and Moravia belonged to the kingdom of the Marcomanni and Quadi; a part of lower Austria and Styria, with Vienna (Vindobona), a municipal city of the Roman empire, belonged to upper Pannonia; the rest of the country, with Carinthia and a part of Carniola, formed a portion of Noricum. Gorz belonged to the Roman province of Illyricum, and Tyrol to Rhetia. These limits became confused by the irruptions of the barbarians. The Boii, Vandals, Heruli, Rugi, Goths, Huns, Lombards, and Avars, in the course of the 5th and 6th centuries, successively occupied the country. But after the year 568, when the Lombards had established their power in upper Italy, the River Enns formed the boundary line between the German tribe of Bajuvarii, the proprietors of the territory above the Enns, and the Avars, who had removed from the east to the banks of that stream. In 611 the Wendi, a Slavonic tribe, appeared on the Murr, Drave, and Save. In 788 the duchy of Bavaria was dissolved, and the Avars passed over the Enns and invaded the counties of the Franks in the Bavarian territory. In 791 Charlemagne forced them to retire to the Raab, and united the territory extending from the Enns to the junction of the Raab with the Danube (the territory below the Enns) with Germany, under the name of Avaria, or the Eastern Mark (Marchia Orientalis), or Austria; and in the 10th century (in a document of Otho III. 996) it was called Oestirichi, equivalent to the modern Oesterreich. Many colonists, particularly from Bavaria, were sent by Charlemagne into the new province, and a margrave was appointed to administer the government. The archbishop of Salzburg was at the head of ecclesiastical affairs. After its separation from Verdun, in 843, Avaria formed the east boundary of the German empire. On the invasion of Germany by the Hungarians, in 900, Avaria fell into their hands, and was held by them till 955, when the Emperor Otho I., in consequence of the victory of Augsburg, reunited a great part of this province to the empire. By the power and address of its margraves the whole country was joined again with Germany, and in 1043, under the Emperor Henry III. and the Margrave Albert I. (the Victorious), its limits were extended to the Leitha.

Austria under the House of Bamberg till 1282.—From 982 to 1156 the margraviate of Austria was hereditary in the family of the counts of Badenurg (Bamberg); the succession, however, was not regulated by primogeniture, but by the will of the emperor. In ancient documents mention is made of the estates of Austria in the year 1096. After Henry the Proud (Duke of Bavaria and Saxony) was put under the ban of the empire, Leopold V., margrave of Austria, received the duchy of Bavaria in 1138 from the Emperor Conrad. But when the Margrave Henry, son of Leopold, under the title of *Ja-so-mir-Gott* (Yes-so-me-God), had again ceded it, in 1156, to Henry the Lion, the boundaries of Austria were extended so as to include the territory above the Enns, and the

AUSTRIA

whole was created a duchy with certain privileges. Under this Duke the court resided at Vienna. Duke Leopold VI., the son of Henry, received the duchy of Styria in 1192 as a fief from the Emperor Henry VI., it having been added to the empire by Otho I., in 955, by his victory over the Hungarians. It was this prince who imprisoned Richard Cœur de Lion, king of England. Duke Leopold VII., the youngest son of the former, erected a palace within the city of Vienna, which was long occupied by the Austrian monarchs, under the name of the old castle. Leopold VII., called the Glorious, established the hospital of the Holy Cross, made Vienna, which had adopted a municipal constitution in 1198, a staple town, and granted 30,000 marks of silver for the promotion of trade and commerce. In 1229 he purchased a part of Carniola from the ecclesiastical principality of Freisingen for 1,650 marks, and left the country in a flourishing condition to the youngest of his three sons, Frederick II., surnamed the Warrior. In 1236 this prince was put under the ban of the empire, on account of his joining the alliance of the cities of Lombardy against the Emperor Frederick II.; and Otho, Duke of Bavaria, seized upon his territory above the Enns as far as Lintz. The rest of the country was granted, as a fief by the emperor, to a margrave, and Vienna became an imperial city.

During the emperor's campaign in Italy Duke Frederick recovered the principal part of his lands, and his rights were confirmed by the emperor at Verona, 1245. The rights of Vienna as an imperial city were abolished, and Frederick was to be called king, as sovereign of Austria and Styria; but all his expectations of empire were disappointed by his death in the battle of the Leitha against Bela IV., king of Hungary, 15 July 1246, in the 35th year of his age. Thus the male line of the house of Bamberg became extinct. The period from 1246 to 1282 is styled the Austrian interregnum. The Emperor Frederick II. declared Austria and Styria a vacant fief, the hereditary property of the German emperors, and sent a governor to Vienna, the privileges of which, as an imperial city, were once more renewed. But the female relations of the deceased Duke Frederick, his sister Margaret (widow of the Emperor Henry VI), and his niece Gertrude, by the persuasion of Pope Innocent IV., in 1248, laid claim to the inheritance of their brother. The Margrave Hermann, with the aid of the Pope and a strong party, made himself master of Vienna, and of several Austrian cities. In Styria he was opposed by the governor Meinhard, count of Gorz. But Hermann died in 1250, and his son Frederick, who was afterward beheaded in 1268, at Naples, with Conradin of Suabia, was then only a year old. The whole country was distracted by various parties, and the Emperor Conrad IV. was prevented, by disputes with his neighbors, from turning his attention to Austria. In 1251 the states of Austria and Styria determined to appoint one of the sons of the second sister of Frederick the Warrior, Constantia (widow of the Margrave Henry the Illustrious), to the office of Duke. Their deputies were on the way to Misnia when they were persuaded by King Wenceslaus, on their entrance into Prague, to declare his son Ottocar Duke of Austria and Styria, who made every effort to

support his appointment by arms, money, and especially by his marriage with the empress widow Margaret. Ottocar wrested Styria from Bela, king of Hungary, by his victory of July 1260, in the Marchfeld; and in 1262 forced the Emperor Richard to invest him with both duchies. Soon after, by the will of his uncle Ulrich, the last Duke of Carinthia and Friuli (who died 1296), Ottocar became master of Carinthia, a part of Carniola connected with it, the kingdom of Istria, and a part of Friuli. But his arrogance soon caused his fall. In 1272 he refused to acknowledge Count Rudolph of Hapsburg emperor, and was obliged to defend himself against Rudolph. After an unsuccessful war he was forced to cede all his Austrian possessions in November 1276. In 1277 he attempted to recover these territories, but, in the battle of the Marchfeld, 26 Aug. 1278, he was slain, and his son Wenceslaus was obliged to renounce all claim to them, in order to preserve his hereditary estates. The Emperor Rudolph remained three years in Vienna, and then appointed his eldest son governor. But having succeeded in gaining the consent of the electors of Saxony and Brandenburg, of the three ecclesiastical electors, and of the count-palatine of the Rhine, he granted the duchies of Austria and Styria, with the province of Carinthia, to his two sons, Albert and Rodolph, 27 Dec. 1280.

Austria under the House of Hapsburg.—I. From 1282 to 1526. Albert and Rodolph transferred Carinthia to Meinhard, count of Tyrol, father-in-law to Albert. In 1283 they concluded a treaty, by which Albert was made sole possessor of Austria, Styria, and Carniola. Vienna, having again renounced its privileges as an imperial city, was made the residence of the court, and the successors of Rodolph, from this time, assumed Austria as the family title. The introduction of the Hapsburg dynasty was the foundation of the future greatness of Austria. The despotic Albert was assailed by Hungary and Bavaria and in 1298 he won the Roman crown in an engagement with Adolphus of Nassau. After this he undertook the conquest of Switzerland; but was assassinated 1 May 1308, at Rheinfelden, by his nephew, John of Suabia, from whom he had basely withheld his hereditary estates. The inheritance of John now fell to the five sons of the murdered Albert—Frederick, surnamed the Fair, Leopold, Henry, Albert, and Otho. They were forced to purchase of the Emperor Henry VII. the investiture of their paternal estates (consisting, in 1308, of 26,572 square miles) for 20,000 marks of silver. Under their father, in 1301, the margraviate of Suabia was added to the territories of Austria, and the contest with Bavaria ended in Austria obtaining Neuburg. On the contrary, the attempt of Duke Leopold, in 1315, to recover the forest towns of Switzerland, which had been lost under Albert, was frustrated by the valor of the troops of the Swiss confederacy in the battle of Morgarten. In 1314 his brother Frederick, chosen emperor of Germany by the electors, was conquered by his rival, the Emperor Louis (of Bavaria), in 1322, at Mühldorf, and was his prisoner for two years and a half in the castle of Trausnitz. The dispute with the house of Luxembourg, in Bohemia, and with Pope John XXII., induced the emperor, in 1325, to liberate his captive.

AUSTRIA

Upon this the latter renounced all share in the government, and pledged himself to surrender all the imperial domains which were still in the possession of Austria. But Leopold considered the agreement derogatory to his dignity and continued the war against Louis. Frederick, therefore, again surrendered himself a prisoner in Munich. Moved by his faithful adherence to his word, Louis concluded a friendly compact with Frederick, and made preparations for their common government, 7 Sept. 1325. These preparations, however, were never carried into execution; for the agreement had been concluded without the consent of the electors. Leopold died in 1326, and Henry of Austria in 1327; Frederick also died without children, 13 Jan. 1330, after which his brothers, Albert II. and Otho, came to a reconciliation with the Emperor Louis. After the death of their uncle, Henry, margrave of Tyrol, and Duke of Carinthia (the father of Margaret Maultasch), they persuaded the emperor to grant them the investiture of Tyrol and Carinthia, in May 1335; they ceded Tyrol, however, to John, king of Bohemia, by the treaty of 9 Oct. 1356, in behalf of his son John Henry, or rather of his wife, Margaret Maultasch. In 1344, after the death of Otho and his sons, Albert II., called the Wise, united all his Austrian territories, which, by his marriage with the daughter of the last count of Pfirt, had been augmented by the estates of her father in 1324, and by the Kyburg estates in Burgundy in 1326. Of the four sons of Albert II. (Rodolph, Albert, Leopold, and Frederick), Rodolph II. (IV.) completed the church of St. Stephen's, and died in Milan in 1365, without children, a short time after his youngest brother, Frederick. In 1379 the two surviving brothers divided the kingdom, so that Albert III. (with the Queue) became master of Austria, and gave the other territories to his brother, Leopold III. the Pious. Leopold had made repeated attempts to gain the Hapsburg possessions in Switzerland. He was killed 9 July 1386, on the field of Sempach, where he lost the battle, in consequence of the valor of Winkelried, and Albert administered the government of the estates of his brother's minor sons. Margaret Maultasch ceded Tyrol to him on the death of Meinhard, her only son, who was married to the sister of Albert. She retained nothing but a few castles and 6,000 marks of gold. Her claims to Bavaria also she renounced in consideration of receiving Scharding and three Tyrolese cities, Kitzbuhel, Ballenberg, and Kuffstein, and 116,000 florins of gold. In 1365 Leopold III. had bought the claims of the count of Feldkirch for 36,000 florins; for 55,000 florins Austria received Brisgau from the count of Furstenberg, with the cities of Neuberg, Old Brisach, Kentzingen, and Billingen. The remainder of Carniola and the Windisch Mark, after the death of the last count of Gorz, were purchased, together with the county of Pludentz, from the count of Werdenberg, and the possessions of the count of Hogenberg, for 66,000 florins; and the city of Trieste was acquired in 1380 by aiding in the war between Hungary and Venice. Moreover, the two governments of upper and lower Suabia were pledged for 40,000 florins by the king of Rome, Wenceslaus, to Duke Leopold. The Austrian and Styrian lines, founded by Albert III. and Leopold III., his

brother, continued for 78 years. In 1395, when Albert III. died, his only son, Albert IV., was in Palestine. On his return he determined to take vengeance on Procopius, margrave of Moravia, for his hostile conduct; but he was poisoned in 1404 at Znaym. His young son and successor, Albert V., was declared of age in 1410; and being the son-in-law of the Emperor Sigismund, he united the crowns of Hungary and Bohemia in 1437, and connected them with that of Germany in 1438. But in the following year the young prince died. His posthumous son, Ladislaus, was the last of the Austrian line of Albert, and its possessions devolved on the Styrian line, 1457.

From this time the house of Austria has furnished an unbroken succession of German emperors. Hungary and Bohemia were lost for a time by the death of Albert V., and, after the unhappy contests with the Swiss, under Frederick III., the remains of the Hapsburg estates in Switzerland. But several territories were gained; and, to increase the rising splendor of the family, the emperor conferred upon the country the rank of an archduchy. The dispute which broke out between Frederick and his brothers Albert and Sigismund, relating to the divisions of their paternal inheritance, ended with the death of Albert in December 1464. In the course of the troubles which resulted from this quarrel the emperor was besieged in the citadel of Vienna by the citizens, who favored the cause of the murdered prince. Sigismund now succeeded to his portion of the estate of Ladislaus and Frederick became sole ruler of all Austria. His son Maximilian, by his marriage with Mary, the surviving daughter of Charles the Bold, united the Netherlands to the Austrian dominions. But it cost Maximilian much anxiety and toil to maintain his power in this new province, which he administered as the guardian of his son Philip. After the death of his father, 19 Aug. 1493, he was made emperor of Germany, and transferred to his son Philip the government of the Netherlands. Maximilian I. added to his paternal inheritance all Tyrol, and several other territories, particularly some belonging to Bavaria. He also acquired for his family new claims to Hungary and Bohemia. During his reign Vienna became the great metropolis of the arts and sciences in the German empire. The marriage of his son Philip to Joanna of Spain raised the house of Hapsburg to the throne of Spain and the Indies. But Philip died in 1506, 13 years before his father, and the death of Maximilian, which happened 12 Jan. 1519, was followed by the union of Spain and Austria; his grandson (the eldest son of Philip), Charles I., king of Spain (see CHARLES V.), was elected emperor of Germany. In the treaty of Worms, 28 April 1521, and of Ghent, 7 May 1540, he ceded to his brother Ferdinand all his hereditary estates in Germany, and retained for himself the kingdom of the Netherlands. The house of Austria was now the proprietor of a tract of country in Europe comprising 360,230 square miles. The Emperor Charles V. immediately increased the number of provinces in the Netherlands to 17, and confirmed their union with the German states, which had been concluded by his grandfather, under the title of the circle of Burgundy. In 1526 Austria was recognized as a European monarchy.

AUSTRIA

II. From 1526 to 1740. Ferdinand I., by his marriage with Anna, the sister of Louis II., king of Hungary, who was killed in 1526 in the battle of Mohacs, acquired the kingdoms of Hungary and Bohemia, with Moravia, Silesia, and Lusatia, the appendages of Bohemia. Bohemia rejoiced to hail Ferdinand its king. Notwithstanding the divided opinions of the nobles, and the rising fortune of his adversary, John von Zapolya (see HUNGARY), he was raised to the throne of Hungary, 26 Nov. 1526, by the Hungarian Diet, and was crowned 5 Nov. 1527. But Zapolya resorted for assistance to the Sultan, Soliman II., who appeared in 1529 at the gates of Vienna. The capital was rescued from ruin solely by the count of Salm, general of the Austrian army, and the imperial forces compelled Soliman to retreat. In 1535 a treaty was made by which John von Zapolya was allowed to retain the royal title and half of Hungary, and his posterity were to be entitled to nothing but Transylvania. But after the death of John new disputes arose, in which Soliman was again involved, and Ferdinand maintained the possession of lower Hungary only by paying the war-like Sultan the sum of 30,000 ducats annually. This took place in 1562 Ferdinand was equally unsuccessful in the duchy of Wurtemberg. This province had been taken from the restless Duke Ulrich by the Suabian confederacy, and sold to the Emperor Charles V.; and when his estates were divided it fell to Ferdinand. Philip, landgrave of Hesse, the friend of Duke Ulrich, took advantage of the opportunity offered him by the embarrassment of Ferdinand in the Hungarian war. With the aid of France he conquered Wurtemberg; but France ceded it again to Ulrich in the treaty of Caden, in Bohemia, concluded 29 June 1534, on condition that the province should still be a fief of Austria, and after the extinction of the male line of the Duke that it should revert to that country. Ferdinand received also the imperial crown in 1556, when his brother Charles laid by the sceptre for a cowl. He died 25 July 1564, with the fame of an able prince, leaving 3 sons and 10 daughters. According to the directions given in his will, the three brothers divided the patrimony, so that Maximilian II., the eldest son, who succeeded his father as emperor, obtained Austria, Hungary, and Bohemia; Ferdinand, the second son received Tyrol and Hither Austria; and Charles, the third, became master of Styria, Carinthia, Carniola, and Gorz. But in 1595, after the death of the Archduke Ferdinand, the husband of Philippine Welser, the fair maid of Augsburg, his sons Andrew (cardinal and bishop of Constance and Brixen, and governor of the Netherlands for Spain) and Charles (margrave of Burgau) were declared incompetent to succeed their father, and his possession reverted to his relations. In Hungary the Emperor Maximilian met with far better fortune than his father had done. The death of Soliman at Szigeth in 1566 was followed by a peace, and in 1572 Maximilian crowned his eldest son, Rodolph, king of Hungary; he was afterward crowned king of Bohemia, and was elected king of Rome. In his attempts to add the Polish crown to his Austrian dominions he was equally unsuccessful with his fourth son, Maximilian, who engaged in a similar enterprise after the decease of

Stephen Bathori in 1587. Maximilian died 12 Oct. 1576, and Rodolph the eldest of his five sons, succeeded to the imperial throne. The most remarkable events by which his reign is distinguished are the war against Turkey and Transylvania, the persecutions of the Protestants, who were all driven from his dominions, and the circumstances which obliged him to cede Hungary in 1608, and Bohemia and his hereditary estates in Austria in 1611, to his brother Matthias. From this time we may date the successful exertions of the Austrian sovereigns to put down the restless spirit of the nation, and to keep the people in a state of abject submission. Matthias, who succeeded Maximilian on the imperial throne, concluded a peace for 20 years with the Turks; but he was disturbed by the Bohemians, who took up arms in defense of their religious rights. Matthias died 20 March 1619, before the negotiations for a compromise were completed. The Bohemians refused to acknowledge his successor, Ferdinand II., and chose Frederick V., the head of the Protestant League, and elector of the palatinate, for their king. After the battle of Prague, 1620, Bohemia submitted to the authority of Ferdinand. He immediately applied himself to eradicate Protestantism out of Bohemia proper and Moravia. At the same time he deprived Bohemia of the right of choosing her king, and of her other privileges. He erected a Catholic court of reform, and thus led to the emigration of thousands of the inhabitants. This large exodus of inhabitants did much to retard the growth of Bohemia. In fact the religious wars waged upon Bohemian soil for so long a time, dating back to the first outbreaks of the Hussites, with the subsequent agitations and conflicts consequent upon the Reformation, long and seriously hampered that state's general development up to modern times. The Austrian states also favoring, in general, the Protestant religion, were compelled by Ferdinand to swear allegiance to him, and Lutheranism was strictly forbidden in all the Austrian dominions. The province of Hungary, which revolted under Bethlen Gabor, prince of Transylvania, was, after a long struggle, subdued. This religious war dispeopled, impoverished, and paralyzed the energies of the most fertile provinces of the house of Austria. During the reign of Ferdinand III., the successor of Ferdinand II. (1637-57), Austria was continually the theatre of war.

In the midst of these troubles Ferdinand ceded Lusatia to Saxony at the peace of Prague, concluded in 1635; and when the war was ended he ceded Alsace to France, at the peace of Westphalia in 1648. The Emperor Leopold I., son and successor of Ferdinand III., was victorious through the talents of his minister Eugene, in two wars with Turkey; and Vienna was delivered by John Sobieski and the Germans from the attacks of Kara Mustapha in 1683. In 1687 he changed Hungary into a hereditary kingdom, and joined to it the territory of Transylvania, which had been governed by distinct princes. Moreover, by the peace of Carlovitz, concluded in 1699, he restored to Hungary the country lying between the Danube and the Theiss. It was now the chief aim of Leopold to secure to Charles, his second son, the inheritance of the Spanish monarchy, then

AUSTRIA

in the hands of Charles II., king of Spain, who had no children; but his own indecision, and the policy of France, induced Charles II. to appoint the grandson of Louis XIV. his successor. Thus began the war of the Spanish Succession (see SUCCESSION WARS) in 1701. Leopold died 5 May 1705, before it was terminated. Emperor Joseph I., his successor and eldest son, continued the war, but died without children, 17 April 1711. His brother Charles, the destined king of Spain, immediately hastened from Barcelona to his hereditary states, to take upon him the administration of the government. He was elected emperor 24 December of the same year; but was obliged to accede to the peace of Utrecht, concluded by his allies at Rastadt and Baden in 1714. By this treaty Austria received the Netherlands, Milan, Mantua, Naples, and Sardinia. In 1720 Sicily was given to Austria in exchange for Sardinia. The duchy of Mantua, occupied by Joseph in 1708, was now made an Austrian fief, because it had formed an alliance with France prejudicial to the interests of Germany. This monarchy now embraced 191,621 square miles. Its annual income was between 13,000,000 and 14,000,000 florins, and its army consisted of 130,000 men; but its power was weakened by new wars with Spain and France. In the peace concluded at Vienna 1735 and 1738, Charles VI. was forced to cede Naples and Sicily to Don Carlos, the Infante of Spain, and to the king of Sardinia a part of Milan, for which he received only a part of Parma and Piacenza. In the next year, by the peace of Belgrade, he lost nearly all the fruits of Eugene's victories, even the province of Temeswar; for he was obliged to transfer to the Porte, Belgrade, Servia, and all the possessions of Austria in Walachia and Bosnia. All this Charles VI. willingly acceded to, in order to secure the succession to his daughter, Maria Theresa, by the Pragmatic Sanction. This law of inheritance was passed 1713-19, and acknowledged one after another by all the European powers.

Austria under the House of Hapsburg-Lorraine.—By the death of Charles VI., 20 Oct. 1740, the male line of the Austrian house of Hapsburg became extinct; and Maria Theresa having married Stephen, Duke of Lorraine, ascended the Austrian throne. On every side her claims were disputed, and rival claims set up. A violent war began in which she had no protector but England. Frederick II. of Prussia subdued Silesia; the elector of Bavaria was crowned in Linz and Prague, and in 1742 chosen emperor under the name of Charles VII. Hungary alone supported the queen. But in the peace of Breslau, concluded 4 June 1742, she was obliged to cede to Prussia, Silesia, and Glatz, with the exception of Teschen, Jagerndorf, and Troppau. Frederick II., by assisting the party of Charles VII., soon renewed the war. But Charles died 20 Jan. 1745, and the husband of Theresa was crowned emperor of Germany under the title of Francis I. A second treaty of peace, concluded 25 Dec. 1745, confirmed to Frederick the possession of Silesia. By the peace of Aix-la-Chapelle, 18 Oct. 1748, Austria was obliged to cede the duchies of Parma, Piacenza, and Guastalla to Philip, Infante of Spain, and several districts of Milan to Sardinia. The Austrian monarchy was now firmly established;

and it was the first wish of Maria Theresa to recover Silesia. With this object in view she formed an alliance with France, Russia, Saxony, and Sweden. This was the origin of the Seven Years' war; but, by the peace of Hubertsberg, 1763, Prussia retained Silesia, and Austria had sacrificed her blood and treasure in vain. The first paper money was now issued in Austria, called state obligations, and the Emperor Francis erected a bank to exchange them. After his death, 18 Aug. 1765, Joseph II., his eldest son, was appointed colleague with his mother in the government of his hereditary states, and elected emperor of Germany. To prevent the extinction of the male line of her family Maria Theresa now established two collateral lines; the house of Tuscany, in her second son, Peter Leopold; and the house of Este, in the person of the Archduke Ferdinand. For these separations Maria Theresa indemnified the country by the confiscation of several cities, formerly pledged to Poland by Hungary, without paying the sum for which they stood pledged; by obtaining Galicia and Lodomeria in the first profligate division of the kingdom of Poland in 1772; and by the capture of Bukowina, which was ceded by the Porte in 1777. In the peace of Teschen, 13 May 1779, Austria received Innviertel, and the vacant county of Hohenembs in Suabia, the county of Falkenstein, and the Suabian territories of Tettwang and Argen; and thus at the death of the empress, 28 Nov. 1780, Austria contained 234,684 square miles; it had lost 16,366 square miles, and gained 34,301. The population was estimated at 24,000,000; but the public debt also had increased to 160,000,000 florins. The administration of the empress was distinguished by substantial improvements in connection with government, agriculture, trade, and commerce, the education of the people, the promotion of the arts and sciences, and of religion. The foreign relations of the kingdom also, even those with the Roman court, were happily conducted by the talents of her minister, Kaunitz.

Her successor, Joseph II., was active and restless; impartial, but too often rash and violent. While a colleague with his mother in the government he diminished the expenses of the state, and introduced a new system in the payment of pensions and of officers. But after the death of his mother all his activity and talent as a sovereign was fully developed. As severe to the military as to the civil officers, he adhered, however, to liberal principles. The censorship of the press was reformed; the Protestants received full toleration, and the rights of citizens; the Jews were treated with kindness; 900 convents and religious establishments were abolished, and even the visit of Pius VI. made no alteration in Joseph's system of reformation. The system of education he subjected to revision and improvement; and he tried to foster manufactures by duties on foreign goods. But his zeal excited the opposition of the enemies of improvement. The low countries revolted, and his vexation probably led him to attempt the exchange of the Netherlands, under the title of the kingdom of Austrasia, for the palatinate of Bavaria under an elector. But the project was frustrated by the constancy and firmness of the next agnate, the Duke of Deux-Ponts, and by the German league concluded by

AUSTRIA

Frederick II. Joseph was equally unsuccessful in the war of 1788 against the Porte. His exertions in the field destroyed his health; and grief at the rebellious disposition of his hereditary states accelerated his death, which happened 20 Feb. 1790. Joseph II. was succeeded by his eldest brother, Leopold II. By his moderation and firmness he quelled the turbulent spirit of the Netherlands, and restored tranquillity to Hungary. The treaty of Reichenbach with Prussia, 27 July 1790, and the treaty of Sistova, 4 Aug. 1791, led to a peace with the Porte. The unhappy fate of his sister and her husband, Louis XVI. of France, induced him to form an alliance with Prussia, but he died 1 March 1792, before the revolutionary war broke out. Soon after the accession of his son, Francis II., to the throne, and before he was elected German emperor, France declared war against him as king of Hungary and Bohemia. In the first articles of peace, dated at Campo Formio, 17 Oct 1797, Austria lost Lombardy and the Netherlands, and received, as a compensation, the largest part of the Venetian territory; two years previous, in 1795, in the third division of Poland, the Austrian dominions had been enlarged by the addition of west Galicia. In the beginning of the year 1799, the Emperor Francis, in alliance with Russia, renewed the war with France. But Napoleon extorted the peace of Lunéville, 9 Feb. 1801, and Francis acceded to it, without the consent of England. By the conditions of the treaty he was to cede the county of Falkenstein and the Frickthal. Ferdinand, Grand Duke of Tuscany, at the same time renounced his claim to this province and received, in return for it, Salzburg and Berchtesgaden, with a part of the territory of Passau, and was afterward made master of the largest part of Eichstädt, and honored with the title of elector. Austria obtained the Tyrolean archbishoprics, Trent and Brixen, and, notwithstanding its cessions of territory to France, had gained, including its acquisitions in Poland, 9,580 square miles; this made the whole extent 253,770 square miles. The public debt had also increased to 1,220,000,000 florins.

The first consul of France now caused himself to be proclaimed emperor; and 11 Aug. 1804, Francis declared himself hereditary emperor of Austria, and united the Austrian states under the name of the empire of Austria. Immediately after this important act he took arms once more with his allies, Russia and Great Britain, against the government of France. The war of 1805 was terminated by the peace of Presburg, (26 Dec 1805). By the conditions of the treaty Francis was obliged to cede to France the remaining provinces of Italy; to the king of Bavaria, Burgau, Eichstadt, a part of Passau, all Tyrol, Vorarlberg, Hohenembs, Rothenfels, Tettngang, Argen, and Lindau; to the king of Wurtemberg the five towns lying on the Danube, the county of Hohenberg, the landgraviate of Nellenburg, Altdorf, and a part of Brisgau; and to the Grand Duke of Baden the remainder of Brisgau, Ortenau, Constance, and the commandery of Meinau. He received, in return, Salzburg and Berchtesgaden; the elector of Salzburg was compensated by the province of Würzburg; and the dignity of grand master of the Teutonic order was made hereditary in the house of Austria. Thus ended a

war which cost the Austrian monarchy, besides the territories just enumerated, 90,000,000 florins, which were carried away by the French from Vienna, and 800,000,000 for the other expenses of the war; of which Francis paid a large proportion from his private purse. After the formation of the Confederation of the Rhine (12 July 1806) Francis was forced to resign his dignity as emperor of Germany (6 Aug. 1806), which had been in his family more than 500 years. The old German, or Holy Roman, empire thus came to an end, and Francis had now only the title of Francis I., emperor of Austria. In 1809 he resolved on a new war with France, aided only by Great Britain, which did nothing more than furnish some pecuniary assistance and made a useless attack on Walcheren. Austria fought courageously, but in vain. The peace of Vienna (14 Oct. 1809) cost the monarchy 42,380 square miles of territory, 3,500,000 subjects, and more than 11,000,000 florins of revenue. The public debt was also increased to 1,200,000,000 florins, and all the paper money in circulation was estimated at 950,000,000.

Napoleon, after tearing from the Austrian monarchy its fairest provinces—the duchy of Salzburg, with Berchtesgaden, Innviertel, western Hausruckviertel, Carniola, and Gorz, Trieste, the circle of Villach, a large part of Croatia, Istria, a part of the Grisons, the Bohemian territories in Saxony, all west Galicia, the circle of Zamoski in east Galicia, Cracow, with half the salt works of Wieliczka, the circle of Tarnopol, and many other territories which were given to Russia—formed a personal connection with the ancient family of Hapsburg, by his marriage with Maria Louisa, daughter of the emperor of Austria, and (14 March 1812) concluded an alliance with the emperor Francis against Russia. But the emperor of France was repulsed on his invasion of this country; Prussia rose up against him; and after the Congress of Prague had separated without accomplishing anything, Francis, 12 Aug. 1813, declared war against France, and formed an alliance, 9 Sept. 1813, at Teplitz, with Great Britain, Russia, Prussia, and Sweden, against his son-in-law. In the battle of Leipsic, the Austrian troops took an honorable part. The firmness with which the emperor signed the act of proscription against his son-in-law, and fixed the fate of his daughter and her infant, excited general respect. He signed the same act against Napoleon a second time, when he returned from Elba. He also opposed Murat in Italy. Yet the Austrian cabinet endeavored to provide for young Napoleon in the settlement of the affairs of France. By the Congress of Vienna, 1814-15, Austria gained the portion of Italy which is usually known as Lombardy and Venetia, and recovered, together with Dalmatia, the hereditary territories which it had been obliged to cede. The former Grand Duke of Würzburg, on the contrary, ceded his territory to Bavaria, and again took possession of Tuscany. The final act resulting from the congress was signed in 1820. In 1821 liberal movements in Italy were put down. The July revolution of 1830, in France, caused warlike preparations to be made; but after Great Britain had acknowledged the new government Austria acknowledged it also. Insurrections which took place in Modena, Parma, and the Papal states, 1831-2, were

AUSTRIA

suppressed without much difficulty. In the London conference relative to the affairs of Belgium Austria took an active share; but in proportion as Great Britain and France became more closely united, Austria entered into more intimate relations with Russia and Prussia. In the Polish insurrection Austria ultimately gave indications of a strong leaning in favor of Russia. The death of the Emperor Francis I., 2 March 1835, and the accession of Ferdinand I. made little change in the Austrian system of government. Metternich still continued at the head of affairs and to foster the reactionary policy. In 1846 the failure of the Polish insurrection had led to the incorporation of Cracow with Austria, but discontent with the government very widely prevailed in the empire. In Italy, the declarations of Pio Nono in favor of reform, and the concessions into which most of the other governments of the Italian peninsula had been hurried, increased the difficulties of Austria. In Hungary the constitutional opposition became stronger and stronger, and latterly, under the guidance of Kossuth and other popular agitators, assumed the form of a great constitutional movement. In 1848 the expulsion of Louis Philippe shook all Europe to its foundations. Metternich found it impossible any longer to guide the ship of state, and the government found itself compelled to grant a free press, and allow the citizens freely to arm themselves. The popular movement made great progress in Hungary; and in Italy a formidable insurrection broke out, threatening the very existence of the Austrian power in the peninsula. In the very centre of the empire, in Vienna itself, the insurrection made equal progress, and the royal family, no longer in safety, removed to Innsbruck. The Austrian monarchy appeared now to be hanging by a thread. The Hungarian diet declared itself permanent, under the presidency of Kossuth. Various ministerial changes took place, and at last the emperor abdicated in favor of his nephew, Francis Joseph. More vigorous measures were now adopted, and Austria, strongly aided by the forces of Russia, succeeded in suppressing the Hungarian insurrection. Haynau, on the occasion, rendered himself notorious by his severity, and Hungary underwent the fate of a conquered country. The year 1855 is memorable in Austrian history for the conclusion of a concordat with the Pope which put the educational and ecclesiastical affairs of the empire entirely into the hands of the papal see. It established an ecclesiastical censorship of the press, and placed all schools, even private schools, under the surveillance of the bishops; it proclaimed the complete independence of the bishops in relation to the civil government, so that all decrees proceeding from Rome might be published without obtaining the royal *placet*, and it authorized the bishops to convoke the provincial councils and diocesan synods without the consent of the civil authority. In 1859 the hostile intentions of France and Sardinia against the possessions of Austria in Italy became so evident that she declared war by sending an army across the Ticino, but after disastrous defeats at Magenta and Solferino she was compelled to cede Milan and the northwest portion of Lombardy to the Sardinian king. In 1864 she joined with Prussia and the other German states in the spoliation of Denmark, but a dispute about the con-

quered provinces of Schleswig-Holstein involved her in a war with her allies (1866), while at the same time Italy renewed her attempts for the recovery of Venice. Austria had accordingly to show front both in the north and in the south. The southern army under Archduke Albert fought successfully, defeating the Italians under Victor Emanuel at Custoza, 24 June, and driving them back across the Mincio, but the fortune of the northern army under Gen. Benedek was very different. On 3 July Benedek was completely defeated by the Prussian forces at Koniggratz (Sadowa) in Bohemia, and the road to Vienna lay open to the victors. Francis Joseph now ceded Venetia to Napoleon III., and claimed his intervention to assist in procuring a peace, evidently wishing to make a separate treaty with Italy, so as to be at liberty to employ the southern army against Prussia. This design did not succeed, however. Both Italy and Prussia were willing to accept the mediation of Napoleon, but Italy would not hear of a separate arrangement, and continued the war. On 20 July Admiral Tegenhoff defeated the Italian fleet near the Dalmatian island Lissa; but, on the other hand, the Prussians continued to advance into Austria, and threatened Vienna. Francis Joseph accordingly saw himself obliged to conclude a peace with Prussia 23 August, and a little later peace was concluded with Italy also, 3 October. The result of the war was the cession of Venetia through France to Italy, and the withdrawal of Austria from all interference in the affairs of Germany (See SEVEN WEEKS' WAR).

Since 1866 Austria has been occupied chiefly with the internal affairs of the empire. The first aim of the government was to restore the constitution of the state, which had been established in February 1861, but which had been suspended since 1865 owing to the demand of Hungary for self-government. As Austrian statesmen were anxious for a settlement of the dispute, the Hungarian demands were finally agreed to, and the empire of Austria divided into two parts, the one made up of the Cisleithan or Slavonic-German provinces, the other of the Transleithan provinces, the latter forming together the kingdom of Hungary. These two divisions of the empire were to be entirely independent, except in matters of diplomacy and military and naval matters—to some extent also in matters of finance. This settlement was consummated by the coronation of the Emperor Francis Joseph I. as king of Hungary, which took place at Pesth-Ofen, on 8 June 1867. During the session of the Reichsrath, that is, the diet of the Cisleithan provinces, held in the same year, the important question of the concordat of 1855 came up for discussion. The Liberal majority in the diet were desirous of seeing it entirely repealed, but as they fully recognized the insuperable obstacles in the way of this step, they were content to proceed by separate enactments intended to weaken the power that had been gained to the papal see by the concordat. With this end in view three measures were brought forward, one for the re-establishment of civil marriage, one for the emancipation of the schools from the domination of the Church, and one for the placing of the different creeds on a footing of equality. Before 25 May 1868, all these measures had passed through both houses of the diet, and on



COURTESY OF THE BOOKLOVERS MAGAZINE

From a photograph by Pietzner.

EMPEROR FRANCIS JOSEPH.

AUSTRIA

that day they received the imperial sanction. These laws were declared by the Pope to be "abominable," as well as null and void. Further enactments having in view the weakening of the power of the papal see in the state were passed in 1874, and were condemned by the Pope in the severest terms. The fact of the Austro-Hungarian dominions comprising so many different nationalities with different languages has always given the government much trouble, both in the management of internal affairs and in regard to external matters. In the recent revival of the Eastern question, for instance, the course of Austria was hampered by the sympathy shown by the Magyars for the Turks, while her Slav subjects were naturally more favorable to Russia. Previous to the outbreak of hostilities between Russia and Turkey she joined with the other powers in remonstrance with Turkey, but as to the actual struggle remained neutral. At the close of the war in the middle of 1878 Austria took part in the Congress of Berlin, where the settlement of the Eastern question was arranged, and by this congress it was decided that the provinces of Bosnia and Herzegovina should in future be administered by Austria-Hungary instead of Turkey. Since then the external history of the monarchy has been uneventful, but there has been considerable friction at home between the different nationalities and political parties.

Area and Divisions.—The Austrian empire extends from about lat. 42° to 51° N, and from lon. $8^{\circ} 30'$ to $26^{\circ} 30'$ E, the total area in round numbers is 240,000 square miles. Its greatest length from east to west is about 860 miles; its greatest breadth about 400 miles. It is bounded south by Turkey, the Adriatic Sea, and the kingdom of Italy; west by Switzerland, Bavaria, and Saxony; north by Prussia and Russian Poland; and east by Russia and Rumania. On the shores of the Adriatic, along the coasts of Dalmatia, Croatia, Istria, etc., lies its only sea frontage, which, compared to the size of the monarchy, is of insignificant extent. Besides being divided into the two great divisions above mentioned, the Austro-Hungarian monarchy is further divided into a number of governments or provinces. The following table exhibits the name and area of these governments, with their population in 1890 and 1900:

Natural Features.—Although presenting every variety of surface the prevailing character of the Austrian dominions is mountainous, there being few districts where mountains are not found; while the plains do not occupy more than a fifth part of the whole superficies. The loftiest ranges, and the most extensively ramified, are found in Tyrol, Styria, Illyria, and the southern parts of Austria proper. In some of these regions the scenery is bold and romantic, and has been considered equal to that of Switzerland. The most extensive tracts of low or flat land occur in Slavonia and the southeast and central parts of Hungary; much of this level land is remarkably fertile, but it is met at various points by vast morasses and arid steppes. The principal valleys are found in Tyrol, Salzburg, Styria, and Illyria. Extensive plains stretch along the courses of the rivers, particularly the Danube, the Theiss, and the March. The principal rivers of Austria are the Danube, the Elbe, the Save, the Drave, the Waag, the March, the Inn, the Teiss or Theiss, and the Maros. The Danube for upward of 800 miles is navigable for quite large vessels throughout the whole Austrian territory; while all the others, most of them tributaries of the Danube, are navigable for vessels of smaller size. All the rivers abound in fish. The lakes are numerous and often picturesque, although those in the lowlands, particularly in the plains of Hungary, are rather marshes than lakes. Austria lies between the isotherms of 60° and 50° , and has a climate nearly as various as its surface. The northern regions, between the 49th and 51st degrees of north latitude, have an average temperature resembling that of the north of France. Between lat. 46° and 49° the heat is considerable; and between 42° and 46° , which comprises the whole of South Austria, it is still greater; the winter lasting two or three months only, and being, in general, extremely mild. The principal products of the north are wheat, barley, oats, and rye; in the centre, vines and maize are added; and in the south, olives. The productive capabilities of the soil, however, are not rendered available to their full extent. The wines of Austria are inferior on the whole, with exception of a few choice kinds, including the well-known Tokay. A great portion of the

DIVISIONS.	Area in sq. m.	Population, Dec. 31, 1890.	Population, Dec 31, 1900.
<i>Austrian Provinces —</i>			
Lower Austria.....	7,654	2,661,799	3,100,493
Upper Austria.....	4,631	785,831	810,246
Salzburg.....	2,767	173,510	192,763
Styria.....	8,670	282,708	1,356,494
Carinthia.....	4,005	361,008	367,337
Carniola.....	3,856	498,958	508,150
Coast land.....	3,084	695,384	756,546
Tyrol and Vorarlberg.....	11,324	928,769	981,989
Bohemia.....	20,060	5,843,094	6,318,697
Moravia.....	8,583	2,276,870	2,437,706
Silesia.....	1,987	605,649	680,422
Galicia.....	30,307	6,607,816	7,315,816
Bukowina.....	4,035	646,591	730,195
Dalmatia.....	4,940	527,426	593,783
Hungarian Provinces —	115,903	23,895,413	26,150,597
Hungary and Transylvania.....	108,258	15,231,527	16,656,904
Croatia and Slavonia.....	16,773	2,201,927	2,397,249
Fiume.....	8	30,337	38,139
Military out of the country.....		25,752	114,811
Total	125,039	17,489,543	19,207,103
	240,942	41,384,956	45,357,700

AUSTRIA

worst wine is made into brandy. The average produce of wine is about 540,000 gallons, of which Hungary yields by far the largest proportion. The forests cover 69,000 square miles, or one third of the productive soil of the empire, and yield timber of excellent quality, adapted for all purposes. Wild deer, wild swine, chamois, foxes, lynxes, and a species of small black bear, are found in many districts, the fox and lynx being particularly abundant. Herds of a native breed of horses, of small size, roam wild over the plains of Hungary. All the domestic animals of England are known throughout the empire. A large portion of the countries now composing the Austrian empire was at one time submerged by the sea, particularly Hungary, where the general appearance of its vast plains, the nature of their soil, and, above all, the occurrence of fossil sea shells, leave no room to doubt the former dominion of the ocean. Throughout all Austria the Tertiary formation prevails, with a margin of the Secondary formation, stretching to a greater or lesser extent into the surrounding countries, and diversified by patches of igneous rocks of the Tertiary and Alluvial epochs. In mineral productions Austria is very rich, possessing, with the exception of platinum, all the metals. We may more particularly mention gold, silver, iron, copper, lead, zinc, quicksilver, coal, and salt. The total annual value of the mineral products of the Austrian empire is estimated at upward of £12,000,000; of which £2,300,000 represents coal; £2,000,000 lignite; £4,300,000 smelted ores; and £3,400,000, salt.

Manufactures and Commerce.—Manufactures are in the most flourishing condition in Bohemia, Moravia, Silesia, and Lower Austria; less so in the eastern provinces, and insignificant in Dalmatia, Bukowina, and the military frontiers. The total money value of manufactured products amounts to at least £130,000,000, the value of agricultural products to more than £200,000,000. As regards the individual branches of manufacture, there are machines produced yearly to the value of £4,000,000 to £5,000,000, and the supply about equals the demand. In the manufacture of musical and scientific instruments Austria holds a high position; those of Vienna are especially celebrated. The manufacture of stoneware and chinaware is very extensive, being valued at about £2,500,000 yearly, and giving rise to a brisk export trade. The glass manufacture is one of the oldest and most highly developed branches of industry in Austria. The manufactories, about 200 in number, are spread over the whole of the monarchy, but are most numerous in Bohemia, where glass and glasswares of every kind are produced. The yearly value of this class of manufactures is estimated at about £2,500,000, of which a very considerable quantity is exported. The manufacture of metal goods is carried on to a great extent, being valued at about £10,000,000; and some of the iron and steel goods, such as scythes and reaping hooks, have a world-wide reputation. The manufacture of gold and silver plate and jewelry is also important, and the articles of Vienna workmanship compete successfully with the French. The production of chemicals reaches the amount of £5,000,000, and about covers the home demand. As regards articles of food, the sugar from beets has an annual value of about £12,000,000; of beer the produc-

tion is £4,000,000 in value, the number of breweries is over 2,000; spirits are distilled to the value of £3,500,000. The manufacture of tobacco is a state monopoly, and is carried on in 38, mostly large, establishments. Of textile industries, the silk manufacture, since the loss of the Lombardo-Venetian provinces, has become greatly limited. The manufactures of woolen, hemp, and flax are among the oldest and most important of the state. The first gives employment to about 400,000 persons, and turns out about £14,000,000 worth of goods yearly, of which a considerable proportion is annually exported. In the whole monarchy there are about 650,000 spindles and 65,000 looms employed in woolen weaving. The linen manufacture (including also hemp and jute) gives employment to a greater number of persons than any other branch of industry (many of them in their homes), and produces goods to a greater value. The chief seats of the manufacture are Bohemia, Moravia, and Silesia. The annual produce of the cotton manufacture is next in value to that of woolens. Although about 2,400,000 spindles are in activity, cotton yarn has to be imported. On the other hand, however, excellent cotton cloths are exported. Tanning is carried on to the greatest extent in Moravia, Lower Austria, and Bohemia, yet not sufficiently to supply the demand. The manufacture of leather goods, however, is very large, and in the production of gloves (in Vienna and Prague) Austria stands next to France. Altogether the manufacture of leather and leather goods employs about 200,000 persons and produces goods to about £10,000,000 yearly.

In addition to the general import and export trade, Austria carries on,—partly from its central position in the continent of Europe, and partly from its numerous navigable streams, excellent roads, and in later times its partially completed railway system,—a very considerable amount of business in the transit of goods through her territory to other countries. In 1887 the total value of the imports into Austria-Hungary was, in round numbers, £53,900,000, while the value of the exports was £69,860,000; the respective figures for the year 1897 were £62,940,000 and £63,854,000. These values were exclusive of coin and bullion, the import of which into Austria-Hungary in 1897 amounted to £8,322,000, while the export for the same year was £4,304,000. The principal import is raw cotton, which was imported in 1897 to the value of £4,225,000; wool being imported to the value of £3,209,000; cotton and woolen yarn to the value of £2,433,000; silk and silk goods to the value of £2,725,000; coffee to the value of £2,192,000; tobacco leaf and manufactured to the value of £2,167,000; coal and coke to the value of £3,100,000. Among the other chief articles furs and hides were imported to the value of £1,842,000; leather was imported to the value of £1,783,000; machinery, locomotives, etc., to the value of £1,642,000; hardware and clocks to the value of nearly £1,000,000; books, newspapers, and maps to the value of £1,492,000; grain to the value of £3,400,000; cattle to the value of £1,300,000. Wood formed the chief article of export, the value of this product being in 1897 £7,000,000; next came sugar, value £5,120,000; cattle to the value of £3,800,000. Among other exports of importance were grain to the value of £3,475,000; leather and leather

AUSTRIA

wares (including gloves), £2,242,000; hardware, £1,533,000; eggs, £3,660,000; coal and coke, £2,850,000; woolen manufactures, £1,542,000; glass and glassware, £1,867,000; paper and paperwares, £909,000; wool, £883,000; malt, £2,042,000; wooden goods, £1,600,000; hides, etc., £1,420,000. Nearly one half of the commerce of Austria is carried on with Germany, the next places being occupied by Great Britain, Italy, Russia, and the United States. Including fishing vessels and small craft, Austria-Hungary, in the beginning of 1897, had 12,447 vessels of all sizes, with a tonnage of 270,250, and employing 34,431 men. Of these 227 of 212,069 tons were sea-going vessels, the coasting vessels being 1,739 in number with a tonnage of 35,515. The principal ports of the empire are Trieste, Pola, and Fiume. In 1898 there were 20,445 miles of railway open for traffic in the empire, of which 10,598 were in Austria, and 9,847 in Hungary.

Money, Weights, and Measures.—On 1 Jan. 1900 a new monetary system went into effect, the coinage being changed from a silver to a gold basis, and the standard coin and money of account being the crown (equal to 20.3 cents in United States gold). Practically the chief medium of exchange is banknotes, of various denominations. The Austrian centner, the weight by which all large quantities are rated, is 123½ pounds avoirdupois. The metze (pl. metzen), the largest dry measure=17 of a bushel, or somewhat less than the fourth part of an English imperial quarter, nine metzen making two quarters nearly. The eimer, the most generally used liquid measure, is equal to 14.94 English wine gallons. The Vienna foot is equal to 12.45 inches English. The joch of land is 1.43 English acre.

Population—None of the European states, with the exception of Russia, exhibits such a diversity of race and language among their population as does the Austrian empire. The Slavs, who amount to above 19,000,000, or 45 per cent of the total population, are the chief of the component nationalities of the monarchy in point of numbers, forming the great mass of the population of Bohemia, Moravia, Carniola, Galicia, Dalmatia, the kingdom of Croatia and Slavonia, and Northern Hungary, and half the population of Silesia and Bukowina. This preponderance, however, is only apparent, as none of the other races are split up into so many branches differing so greatly from each other in language, religion, civilization, manners, and customs. These branches are the North Slavic Czechs, Moravians, and Slovaks, the Ruthenians and Poles, and the South Slavic Slovenians, Croats, Serbs, and Bulgarians. The Germans, about 10,570,000 in number, are scattered over the whole monarchy and form almost the sole population of the archduchy of Austria, Salzburg, the greatest portion of Styria and Carinthia, almost the whole of Tyrol and Vorarlberg, considerable portions of Bohemia and Moravia, the whole of the west of Silesia, etc.; and they are also numerous in Hungary and Transylvania. The Magyars or Hungarians (7,440,000 in number, or about 16 per cent of the total population) form the great bulk of the inhabitants of the kingdom of Hungary and of the eastern portion of Transylvania. To the Italic or Western Romanic stock belong the inhabitants of South Tyrol and parts of the coast lands and Dalmatia, numbering about 700,000 in all. A

considerable portion of the southeast of the empire is occupied by members of the Rumanian (or Eastern Romanic) stock, who number altogether about 2,800,000, and form more than half the population of Transylvania, besides being spread over the southeastern parts of Hungary, Bukowina, and part of Croatia and Slavonia. The number of Jews is also very considerable (above 1,000,000), especially in Galicia, Hungary, Bohemia, and Moravia. There are also several other races whose numbers are small, such as the Gypsies (95,000), who are most numerous in Hungary and Transylvania, and the Albanians in Dalmatia and neighboring regions. The population is thickest in Lower Austria, Bohemia, Silesia, and Moravia; thinnest in Salzburg. Generally speaking, it decreases in density from west to east.

Religion.—The state religion of Austria is the Roman Catholic, and next in numbers is the Greek Church. Calvinism and Lutheranism are also professed by a large body of the people; the former mostly in Hungary and Transylvania, the latter in the German provinces and in Galicia. The civil power exercises supreme control in all ecclesiastical matters, the emperor being, in everything but name, head of the Church; and as no sentence of excommunication, or other ecclesiastical edict, can be issued without the sanction of the Crown, the Pope's direct authority in Austria is somewhat limited. In 1890 there were in the Austrian portion of the monarchy 18,784,063 Roman Catholics, 2,797,089 Greek Catholics united to the Roman Church, 540,715 non-united, 430,849 Protestants, and 1,135,118 Jews. In Hungary and Transylvania there were 8,823,105 Roman Catholics, 1,670,283 Greek united and 2,633,491 non-united, 3,427,806 Protestants, and 724,588 Jews.

Education.—The intellectual culture of the people is at very different stages of advancement among the different races. It is highest in the German provinces and lowest in the east. In Upper and Lower Austria, Salzburg, Tyrol, Moravia, Silesia, and Bohemia, almost all the children of suitable age are in attendance on the public schools; while in Bukowina only about 34, and in Galicia about 59 per cent of them are at the schools. The educational system has been entirely remodeled in recent times. The elementary schools, or those in which the common branches are taught, are designated national schools or schools for the people (*Volksschulen*), and there children have to attend from the end of their 6th to the end of their 14th (in some provinces only their 12th) year. A higher class of elementary schools are known as town schools (*Burgerschulen*), in which a superior education may be obtained. For the training of instructors for the people's schools, there are 43 normal schools for male teachers and 26 for female. As secondary schools or institutions of a more advanced grade, there are the gymnasias and the "real-schools," as they are called. The gymnasias resemble the best sort of our grammar schools, being intended chiefly to prepare pupils for the universities, great attention being paid in them to the classical languages. In the real-schools a more practical end is kept in view, and modern languages and physical science form the groundwork of the educational course. A complete course in a gymnasium extends over four years, in a real-school either three or four. There

AUSTRIA

are also schools of an intermediate stamp known as "real-gymnasias." The higher education is provided for by the universities, the polytechnic institutes, and the various institutions in which particular subjects are taught. There are 11 universities in the monarchy, namely, in Vienna, Prague (two—a German and a Bohemian), Pesth, Gratz, Cracow, Lemberg, Innsbruck, Klausenburg, Agram, and Czernowitz. Most of these have four faculties—Catholic theology, law and politics, medicine, and philosophy. There are also several technical high schools in which mathematics, physics, and natural science are the chief objects of study. Besides these there are theological institutions; schools for jurisprudence and philosophy; schools of commerce, industrial arts, agriculture, arboriculture, and mining; military schools, naval schools, art schools, conservatories of music, etc. The principal libraries are the royal library at Vienna, with 450,000 volumes, 24,000 manuscripts, and 7,000 incunabula; and the university libraries of Vienna and Prague.

Constitution, Revenue.—As already mentioned, the Austrian dominions now consist of a German, or Slavo-Germanic, or Cisleithan empire, and a Transleithan or Hungarian kingdom, each with its own parliament, ministers, and government. The same hereditary sovereign rules over both, and they have a common army and navy, and a sort of common parliament known as the Delegations. The Delegations consist of 120 members, one half of whom are chosen by and represent the legislature of German Austria, and the other half that of Hungary, the upper house of each legislature returning 20 and the lower house 40 deputies. In all matters affecting the common affairs of the monarchy the Delegations have a decisive vote, and their resolutions do not require the confirmation of the representative assemblies in which they have their source. The Delegations meet alternately in Vienna and Budapest. Their ordinary mode of procedure is to sit and vote in two chambers, the 60 deputies of Cisleithan Austria forming the one, and the 60 of Hungary the other. But if no agreement can be arrived at in this manner, the two bodies must meet together and without further debate give their final vote, which is binding for the whole empire. The jurisdiction of the Delegations extends specially to all matters affecting foreign affairs, war, and finance. The constitution of German Austria was finally established in December 1867. The provinces have each a diet or legislature of their own for provincial affairs, these diets being 16 in number, one each for Bohemia, Dalmatia, Galicia, Upper Austria, Lower Austria, Salzburg, Styria, Carinthia, Carniola, Bukowina, Moravia, Silesia, Tyrol, Vorarlberg, Görz and Gradisca, and Istria, the municipal council of Trieste having similar functions. The provincial diets are composed of the archbishops and bishops, the rectors of the universities, the representatives of the great estates, of towns, of boards of commerce, of rural communes, etc. The laws passed in these diets have reference to provincial taxation, agricultural, educational, and other matters. The national parliament or legislature of German Austria, called the *Reichsrath* (or council of the realm), consists of an upper house or house of lords (*Herrnhäus*), and a lower house or house of deputies (*Abgeordnetenhaus*).

The former is composed of princes of the imperial family, of nobles whose families have a hereditary right to this dignity, of the archbishops, the bishops of princely rank, and of a certain number of life members nominated by the emperor. The lower houses consist of 353 members, elected by all citizens above 24 possessing a small property qualification. The rights belonging to the Reichsrath are: consent to all laws relating to military service; co-operation in the legislation on commercial matters, customs, railways, etc.; and examination of the estimates of the income and expenditure of the state, and other financial matters. The constitution of Hungary, including also Croatia, Slavonia, and Transylvania, dates from the foundation of the kingdom, or about 895 A.D. It rests upon a number of statutes published at long intervals, the principal of these being the *Bulla Aurea* or Golden Bull of Andrew II, granted in 1222, by which the government was defined as an aristocratic monarchy. The legislative power is vested in the king and the parliament (*Reichstag*) conjointly. The latter consists of an upper house or house of magnates, and of a lower house or house of representatives. The house of magnates consists of the archdukes of the imperial family who have attained their majority, 54 ecclesiastical dignitaries, 151 counts, and 36 barons as hereditary members, 84 life members nominated by the sovereign, or elected by the chamber, etc. The lower house (of 453 members) is composed of elected representatives. The Hungarian Reichstag corresponds to the Reichsrath of the Cisleithan provinces, and accordingly only deals with such matters as are common to the provinces belonging to the Hungarian crown. Transylvania is, so far as legislation and administration are concerned, entirely incorporated with Hungary. Croatia and Slavonia, however, have a Landtag or diet of their own, which, like the provincial diets of the Cisleithan portion of the empire, consists of only one chamber, and which is competent to deal with all matters belonging to the interior administration of the provinces, with religion and education, and with the administration of justice. Fiume, which was formerly associated with Croatia and Slavonia, and subject to the Landtag of these provinces, has, since August 1870, been put directly under the central Hungarian government.

There being three distinct parliaments in the empire, there are also three budgets, namely, that for the whole empire, that for Cisleithan, and that for Transleithan Austria. In the budget of the whole empire for 1902 the revenue and expenditure were each estimated at 365,181,966 crowns; in that for Cisleithan Austria the revenue was estimated at 1,685,966,357 crowns, and the expenditures at 1,685,117,944 crowns; and in that for Transleithan Austria the estimated revenue was 1,086,870,018 crowns, the estimated expenditure being a little less. A small portion of the imperial revenue of Austria is derived from customs and other sources, and the remainder is made up by the two divisions of the empire, 70 per cent thereof being contributed by the Cisleithan and 30 per cent by the Transleithan portion.

Recent Politics.—Austria to-day is what Metternich with less truth called Italy, little more than a geographical expression. Three bonds do indeed unite its discordant nationalities; but

AUSTRIA

for the hasty observer the country might well seem in the last stages of decomposition. There is nothing really Austrian in Austria—no Austrian interests, no Austrian language, or literature, or patriotism, no Austrian nationality, no Austrian standard of civilization; nothing except the emperor, and the army, and the cockpit of the Reichsrath that the races share in common. The Germans form a compact entity by themselves in Upper and Lower Austria and the Duchy of Salzburg. In Bohemia there is a respectable colony of them along the borders of Saxony and Bavaria, over 2,000,000 strong, but even so they are outnumbered by the Czechs in the ratio of 3 to 5. All together the German-speaking subjects are about a third of the total population of Austria—some 8,500,000 out of 24,000,000. The Czechs in Bohemia, Moravia, and Silesia number roughly 5,000,000. In Galicia some 4,000,000 Poles hold down a trifle over 3,000,000 Ruthenians. A couple of million Slovenes, Servians, and Croats are scattered over Carinthia and Carniola, while nearly 1,000,000 Italians inhabit the Tyrol. None of these races can alone be said to represent Austria, though all of them claim to; and their mutual wranglings, struggles to realize themselves, struggles to elbow out their neighbors and seize an incontestable ascendancy, are the background, and at times something more, of modern Austrian politics. But for the dashing tenacity of the Magyars, Hungary might be as heterogeneous as her partner in the dual monarchy. The Magyars are only 7,500,000 out of nearly 18,000,000, but they are a race with the fierce hardihood and determination of the Teutonic stock and a grace and fascination that are neither Latin nor Celtic, but distinctively their own. Since the two nations entered into a partnership agreement as coequal and sovereign states, the Magyars have devoted all their brilliant energies and the immense force of a concentrated one-idealness to making themselves paramount throughout the southern half of the realm. They revolted against being Germanized, but see no inconsistency in insisting that the Servians, Croats, Rumanians, and Slovenes shall be Magyarized; and they have set about the task with unsparing persistency just saved from relentlessness by their genius for wise compromise. A restricted suffrage, excluding nineteen twentieths of the people from the polls, keeps public affairs in their grasp. The schools have been a much more effective instrument in the development of a national feeling, and the Magyars have thoroughly worked them to that end. Like the Russians and Americans, but unlike the English, the Magyars recognize that where there is difference of speech there will be difference of sentiment, of heart, of interests, and at a pinch perhaps of loyalty, and have accordingly refused to make the preservation of dialects an object of government. Fifty years ago the Hungarian nobles spoke German and a bastard monkish Latin in their homes and diets. To-day the native tongue obtains, among all classes, and the absorption of all manner of outlanders,—German, Slovacks, Jews, Rumanians, and Croats,—by the irresistible and peaceful process of denationalization in the schoolroom, has gone on at such a pace that the Magyars increase nearly three times as quickly as any of the neighboring races. The struggle of the nationalities in Hungary has ended

in a more or less resigned acquiescence in Magyar rule.

In Austria, as in Spain, the factory is placed some distance behind the barracks as an element of national welfare, and a contemptuous bureaucracy shackles trade with a hundred entangling regulations. The Magyars, on the other hand, have been as attentive to commerce as to their racial position. Perhaps there is no country in which the state, as such, has done more for industrial development. The really vital domestic problems of Hungary are, indeed, no longer racial, and as freedom of worship is the law, they have never been acutely religious. But in the rise of what is called Agrarian Socialism, there is something that may test Magyar statesmanship severely. Meanwhile the Magyars are the backbone of the dual monarchy. Against the rising tides of Pan-Slavism they present a compact and unbending front. Together with the German empire they may be considered the outposts of Europe against Slav aggression; and even in the domestic affairs of the monarchy their unbreakable unity as a political force has made their influence well-nigh decisive. The *Ausgleich* of 1867,—the partnership agreement between the two halves of the realm,—prescribed that matters of common concern, such as foreign affairs, diplomatic representation, and naval and military matters, should be arranged by 60 delegates from each country, meeting twice a year. The Austrian delegation is made up of Germans, Czechs, Poles, Ruthenians, Italians, whose feuds make steady co-operation all but impossible. The Hungarian delegation, on the other hand, is composed of 55 Magyars and 5 Croatsians, working with the directness and harmony of a single man. The consequence is that in the long run the Hungarian view is fairly sure to carry the day. So far each renewal of the *Ausgleich* has brought substantial modifications in favor of Hungary, and the centre of gravity has, in fact, shifted from Vienna to Budapest. The emperor, when driven to it, might go against the German-speaking Austrians, but never against the Magyars; and the Magyars, fully realizing their power, have extorted concession after concession from their unhappy partner; have applied the screw so persistently, that it is becoming a question whether they are not as unpopular among Austrian statesmen as the very Czechs themselves. The troubles of the dual monarchy are due to the failure of the Germans to repeat in Austria the successes of the Magyars in Hungary. "You look after your hordes," said Count Beust to a Hungarian statesman when the Austrian empire became the dual monarchy, "and we'll look after ours." The Czechs of Bohemia have turned to ridicule the count's too valiant declaration. The Germans of Vienna, one must remember, are very different from the Germans of Berlin. Of all the sections of the Teutonic race they appear to have the least robustness of intellect or character and the laxest grip on practical affairs. Indolent, hypercritical, and self-satisfied, they are the emasculated editions of their northern kinsmen. From whatever cause, some paralyzing blight of lassitude and ineffectiveness seems to have eaten its way into their energies. Against their cultured fecklessness the Czechs oppose the elemental force of racial ambition, the driving power of a people that has the conscious-

AUSTRIA

ness of a great destiny before it and feels itself on the top of the rising wave.

The Germans protest that they have educated themselves beyond the point where race is everything and cannot at this time of day be expected to return to first principles. It is of course tenable that the variety of parties into which the Germans are split up argues an advanced and broad political intelligence. At the same time it makes a poor barrier against the impact of a race that subordinates everything to a single practical end; and unless the Germans are prepared to see a great part of their old ascendancy pass away, they must be ready to drop "theorizing," take up the issue that has been forced upon them, and meet their antagonists with weapons not necessarily of their own choosing. In other words, they need simplifying if they are to combat the Czechs successfully. As it is, the Czechs for the last 30 years have been slowly driving them to the wall. City after city has fallen into their hands; Prague and Pilsen, that only a quarter of a century ago were German in tongue and sentiment, are now Slavonized down to their very street names. And in politics and industry as well as music and literature and the lighter arts, the past hundred years have seen the Czechs advance in a quite wonderful fashion. They have long ceased to fear the Germans, and with the disappearance of fear comes naturally the claim to equality. Moreover, the Czechs have a strong historical case. Four hundred years ago what are now the crown-lands of Bohemia, Moravia, and Silesia formed the Czech kingdom of St. Václav; and what is now Hungary was then the kingdom of St. Stephen. The Czechs offered their crown in 1526 to the Hapsburgs, at the same time, for the same reasons, and on the same conditions as the Magyars; stipulating only that they should retain their old rights of self-government. This contract, together with the Pragmatic Sanction, was the legal basis of the Hungarian rebellion of 1848. The Czechs still use it to point the justice of their demands for a resurrection of St. Václav's kingdom, maintaining that their case is on all fours with that of Hungary, rests on the same documents, and is supported by the same coronation oaths. The Hapsburgs never quite lived up to their side of the agreement. They allowed the Turks to overrun Hungary at will, and when the Reformation came and the Czechs gathered round John Huss, they stamped out the heresy in blood and established a strong German colony along the northern borders of Bohemia for the protection of the faith and the suppression of the natives. The Czechs have kept their native tongue alive, and just across their borders are their kinsmen of the Russian empire. The card of Russian sympathy is often played, and after every fresh frustration of their national hopes follows the spectacle of 5,500,000 Czechs cautiously sounding the Czar's "racial instinct." It is this that lends color to the common charge that the Czechs are disloyal, but it is to be noticed that when the situation is reversed and the emperor makes even the shortest step toward Home Rule, the Germans at once adopt their opponents' tactics, throw themselves into the arms of their Prussian brethren, and vow that sooner than stay and be swamped by a hated and inferior race, they would willingly exchange the Hapsburgs for the

Hohenzollerns and enroll themselves among Kaiser Wilhelm's subjects. The suspicion cannot be avoided that these dramatics are at bottom intended for home consumption, and that the tune would be quickly changed if the czar or kaiser were to listen too seriously.

The whole history of the dual monarchy goes to show that real consolidation and unity can be effected only by the seemingly paradoxical method of allowing each nationality the widest possible freedom. Justice toward and equal treatment of all races is the only sure road to peace and permanency. It is a hard one for the Germans to tread, for it means the overthrow of an ascendancy once paramount in every corner of the realm; but unless universal suffrage brings to the front an entirely new set of problems, that it must be. The interplay of these racial ambitions has been complicated, sometimes retarded and sometimes acutely emphasized by a hundred differences of religious, economic, and purely political interests, all of which have representatives in the Reichsrath. They act upon one another under the shadow of the racial issues in a way that no foreigner can disentangle. The confusion of the country is worthily reproduced in the 15 distinct parties and the seven or eight languages that crop up in the Vienna parliament. Austria-Hungary is a polyglot chaos in which even Austrians do not profess to see more than a half light. The prophecies of disruption may therefore appear at least plausible. But it is one of the many paradoxes of the dual monarchy that it seems unable to break up. In part it is protected by the very diversity and number of the antagonisms it is obliged to house. A more visible bond of union is the army, in which all must serve, which is of all races and creeds, and therefore of none, and the atmosphere of which is broadly and impressively imperial. What its actual effectiveness will prove to be like, should it ever be tested, is one of the most interesting military problems of the day. The only force with which it can be compared in the excellence of its units and the variety of its nationalities and tongues is the allied army that rescued the Pekin legations; and the parallel is not altogether hopeful. A polyglot army must of necessity be to some extent a disorganized army, and while the forces of the dual monarchy use German as the language of military command, the rank and file and the bulk of the officers retain their own speech for general purposes. The heterogeneous character of its composition has had a steadying influence on the internal struggles of the dual monarchy, however much it may hamper its efficiency on the battlefield. The army has kept itself largely aloof from politics, and though the Czechs did once attempt to transfer the racial bitterness to the parade ground by answering the roll-call in their own tongue, a sharp rebuke from the emperor was enough to bring them to reason.

A second and equally powerful bond of union is the monarchy. Not only is it accepted everywhere, but the idea of upsetting it in favor of any other form of government has never yet been broached. Even the Kossuth irreconcilables, who would like to see the *Ausgleich* abolished and Hungary direct her own fiscal policy,—a quite possible development,—and manage her own foreign affairs, still do

AUSTRIA

not propose to sever the personal tie that binds the two countries. And not only is the monarchy secure in the affections of the people, but the dynasty is equally popular. So long as there is a throne it is not conceivable that any one but a Hapsburg should occupy it. This two-fold devotion to monarchy and to the dynasty has been greatly strengthened of late years, partly by the breakdown of parliamentary government and the weariness which has made the people look to the throne as an escape from the turmoil and wranglings of small groups, and partly through the patience and wisdom, the sterling fair-mindedness and competency of the present emperor, as well as the ghastly tragedies of his private life. But it is a curious delusion to argue that just because Francis Joseph is so adequate and well beloved, and comes so near to the ideal of what a constitutional monarch should be, therefore the empire must go to pieces when his moderating and persuasive influence is withdrawn. Such a reign as his is far more than a merely personal triumph; it is the consecration of a system; it exalts the monarchy as well as the monarch, and it smooths out the path for his successors by bequeathing to them an office made more illustrious by his example and memory, more powerful and more deeply based in the hearts of the people. So far from being a signal for dismemberment, the close of the present emperor's reign is more likely to witness a splendid rally round the house and throne of the Hapsburgs. The general peace of Europe would indeed be jeopardized in the event of a scramble for the fragments of the dual monarchy. But no such catastrophe is likely, for the reason that it is to no one's interest to bring it about. It is not for secession from, but for the fullest liberty within, the empire that "the numerous nationalities involved" are struggling. The only genuine secessionists are Herren Wolf and Schonerer and their followers, who wish to incorporate German-speaking Austria with the German empire. It is possible that their wishes may ultimately be gratified, but not in our time, not till after the next European war, if even then, and not till the clericalism of Austrian Germans has considerably toned down. What the Czechs and the other races want, is the same independence as the Magyars possess, and such independence is as inconsistent with Russian as with German domination. It is against their interests to break away from the Hapsburgs. The day of small states has gone by, and a lonely Czech kingdom could not exist for a year by the side of Russia.

Army—Military service is obligatory on all citizens capable of bearing arms who have attained the age of 20, and lasts up to the age of 42, either in the active army, in the landwehr, or the landsturm. The period of service in the active army is 12 years, of which three are passed in the line, seven in the reserve, and two in the landwehr. In 1900 the standing army numbered 361,693 men (including officers) on the peace footing, and 1,826,940 men and 45,238 officers on the war footing.

Navy—On account of the recent development of the Italian navy, Austria has found it necessary for her self-defense to have a fleet of her own, and the last ship of a new squadron was launched in 1904. The new ships are remarkable for their armament and speed, and

will compare favorably with any equal number and size of ship in the world. Leaving out the ships constructed prior to 1887, the new fleet is composed of two battleships, the *Erzherzog Friedrich* and the *Erzherzog Karl*, of 10,600 and 10,100 tons respectively, and 19.25 knots speed. Each will carry four 9.45-inch Skoda guns of 40 calibres and twelve 7.48-inch of 42 calibres. The first will have in addition fourteen 2.75-inch and the other 2 of the same calibre, each being furnished with a full complement of small bore quickfirs. The 7.48-inch guns will fire four rounds a minute.

The next division is composed of three ships of 8,300 tons each, named the *Habsburg*, *Babenberg* and *Arpad*. Their speed is 18.5 knots, and the armaments three 9.4-inch and twelve 6-inch guns each, besides the usual complement of small calibre quickfirs.

Then comes a division of three coast defence ships, the *Monarch*, *Wien* and *Budapest*, of 5,600 tons each and 17 knots speed. Their armament of four 9.4-inch and six 5.9-inch each, with fourteen smaller calibre quickfirs, is extremely formidable for their size, and it is well disposed and protected, entitling them to be reckoned as battleships.

The cruisers of the Austro-Hungarian navy are, in order of size, the *Kaiser Karl VI.*, of 6,250 tons; the *Maria Theresa*, of 5,370; and the *Kaiser Franz Joseph I* and *Kaiserin Elizabeth*, of 4,060 tons each. Each carries two 9.4-inch guns; the first two eight 6-inch quickfirs; and the last two six 6-inch quickfirs each, with numerous small calibre pieces. Their speed is between 19 and 20 knots, and they hold a place between armored and protected cruisers.

Two ships classed as battleships, launched in 1887, the *Erzherzog Rudolf* of 6,900 tons and the *Erzherzogin Stefanie*, of 5,100 tons, may be added to the effective squadron and would raise it to fourteen vessels. Their armament is sufficiently powerful, consisting of three and two 12-inch, six 4.7-inch and six 6-inch guns respectively, with two 2.75-inch pieces each. Their speed is 16 knots.

There are three small cruisers of 2,300 tons each, the *Zenta*, *Jaguar* and *Aspern*; and three torpedo cruisers, of 1,600 to 1,700 tons each, the *Panther*, *Leopard* and *Tiger*. The seven torpedo boat destroyers, range from 310 to 610 tons, of 21 knots speed, and there is a small torpedo boat flotilla, which is being increased. Experiments are also in progress with submarines.

The personnel of the Austro-Hungarian navy is excellent, and should the squadron it can turn out ever be called on to act alone or as part of the naval force of an alliance, it can be relied on to give a good account of itself.

Judiciary.—The courts of first instance comprise 940 *Bezirksgerichte*, county courts, and 71 *Landes und Kreisgerichte*, provincial and district courts; *Geschworenengerichte*, or jury courts being connected with the latter. These courts act as courts of inquiry and have summary jurisdiction. The courts of second instance, or courts of appeal from the lower courts, having the supervision of the criminal courts, comprise 9 *Oberlandesgerichte* or higher provincial courts. There are also special tribunals for military, revenue, shipping, and other matters, including four industrial courts and three commercial courts. The *Oberste Gerichts und Kassationshof*, Supreme Court of Justice and Court of

AUSTRIAN SUCCESSION — AUTOMATISM

Cassation, at Vienna, is the final court of appeal. The High Court of Administrative Affairs decides differences between private individuals and public officials, and the Reichsgericht, or Court of the Empire, the conflicts of law and jurisdiction between different authorities.

Bibliography.—Broglie, 'Frederick the Great and Maria Theresa'; Coxe, 'History of the House of Austria'; Gindely, 'History of the Thirty Years' War'; Leger, 'History of Austro-Hungary'; Lowell, 'Government and Parties in Continental Europe'; Ranke, 'History of the Reformation in Germany'; Slegnibos, 'Political History of Europe since 1814'; Whitman, 'The Realm of the Hapsburgs'; Whitman and McIlrath, 'Austria.'

Austrian Succession. See SUCCESSION WARS.

Au'thors, British Society of, an association of authors formed in London in 1883, for social and business purposes. It has a governing committee of 30 members; maintains an attractive club-room and publishes a periodical called 'The Author.' The late Lord Tennyson was its president till his death.

Au'thors Club, an American organization founded in New York in 1882, and incorporated in 1887. It is governed by an executive committee without a president. Any person who is the author of a published book proper to literature, or of creditable literary work equivalent to such a book, is eligible to membership. The club holds meetings semi-monthly, and gives Saturday receptions for ladies in the winter season. It has a library consisting of the publications of its members and another devoted to literary biography.

Au'thors, French Society of, an organization founded in Paris in 1837, for the protection of authors in their rights, and open to any man of letters. It is governed by an elective committee of 24 members, and has a pension fund which provides for aid in work, for sickness and in old age. Besides publishing a journal, the 'Chronique,' the society has collected a large sum of money from pirating publishers.

Au'thors, American, Society of, an organization founded in New York in 1892, and incorporated in 1895, having for its objects the promotion of a professional spirit among authors and a better understanding between authors and their publishers, and, in general, the protection of literary property and the advancement of the interests of American authors and literature. All persons engaged in literary pursuits are eligible to membership. The society has a pension fund for members who may become needy.

Auto de fe, ow'tò dá fā (Spanish); **Auto da Fe** (Portuguese), lit. "act of faith." See INQUISITION.

Auto-intoxication, a poisoning of the body by its own products. In the complicated processes that make up the sum total of human metabolism many products are formed which if not modified in some manner would poison and kill the body. The simplest illustration of this is seen in the function of respiration, in which the carbon dioxide in the venous blood is oxidized in the lungs and thus eliminated. The urine

contains a number of bodies which if prevented from leaving the body would cause its death. Thus auto-intoxication may result from the normal products elaborated in the body if these are not modified, or are prevented an outlet. But the problem of auto-intoxication is much more complicated in many of its manifestations. Sick-headache, gout, diabetes, many neuralgias, Addison's disease, myxedema, acromegaly and many other obscure diseased conditions are known to be due to some form of perversion of the normal processes of metabolism and are instanced as forms of auto-intoxication. The general organs of defense in the constant play of these factors may be divided into two general groups, (1) those that have the function of transforming by chemical means many of the poisonous products of the normal metabolism of the body, and (2) those organs that are chiefly concerned in the elimination of these products. To the first group belong the liver, the mucous membranes, the thyroid, lymphnodes, the adrenal glands, the blood cells, the blood serum and the lymph. In the second group are the kidneys, the lungs, the skin, and the intestines.

Classification.—Auto-intoxication may result (1) from the failure of functions of certain organs having a definite chemical function. Pancreatic diabetes, bronze diabetes, pernicious anemia, myxedema, acromegaly, cachexia, strumipriva, Addison's disease, these all come in this class; (2) by a faulty metabolism whereby normal amounts of waste products are not thrown off. Gout, diabetes, oxaluria, are examples of this type; (3) through retention of the normal physiological products in the organs themselves. Carbon dioxide poisoning is a type; (4) by means of excessive production of physiological or pathological products. Diabetic coma, cystinuria, acetonuria, uremia are types of this form. Such a classification is necessarily very inadequate and will be found to be of service only as a general framework on which a more exact systematization of knowledge may take place. Consult: Herter, 'Chemical Pathology' (1902); Vaughan and Novy, 'Cellulartoxins' (1902). See ANIMAL ALKALOIDS; LEUCOMAIN; PTOMAIN; TOXOLOGY.

Au'to Suggest'ion. See HYPNOTISM.

Au'tocrat of the Breakfast Table, The, a noted work by Oliver Wendell Holmes, consisting of imaginary conversations around a board-ing-house table. The characters are introduced to the reader as the Autocrat, the Schoolmistress, the Old Gentleman Opposite, the Young Man Called John, The Landlady, the Landlady's Daughter, the Poor Relation, and the Divinity Student. It is the most popular of Dr. Holmes' books; and in none of them are his ease of style, his wit, his humor, his kindly sympathy and love of humanity, more clearly shown.

Autol'yus, an amusing thief who figures prominently in Shakespeare's 'Winter's Tale.'

Autom'atism, in animals the power of movement or of action without any stimulus independent of that arising in the protoplasm of cells and tissues. Thus Descartes regarded animals (other than man) as "automata," and declared that they act independently of any volition, or instinctive or intellectual power or faculty; in other words, that their so-called mental acts are involuntary and mechanical—that they

AUTOMATON—AUTOMOBILE

may be compared to machines. In physiology while automatism is apparently the result of the internal conditions of the living body, yet strictly speaking, says Loeb, no animal movements are exclusively determined by internal conditions. The co-ordinated character of automatic movements, he says, has often been explained by a "centre of co-ordination," which is supposed to keep a kind of police watch on the different elements and see that they move in the right order. "But," he adds, "observations on the lower animals show that the co-ordination of automatic movements is caused by the fact that the element which beats most quickly forces the others to beat in its own rhythm." The swarm-spores of algæ, which possess no ganglion cells, show spontaneity equal to that of animals having ganglion-cells, and he concludes that automatism is due to a chemical cause; that is, the pressure or absence of certain ions, or, in other words, to the chemical constitution of the protoplasm. Consult Loeb, 'Physiology of the Brain' (1901).

Automaton, a mechanical contrivance whose actions are arranged to correspond to those of a human being. Friar Bacon had the reputation of having constructed a brazen head which spoke, and Regiomontanus an iron fly, which, after making the tour of the room, returned to its master. Albertus Magnus is said to have spent 30 years in constructing a human figure which advanced to the door when anyone knocked, opened it, and saluted the visitor. In the water-clock presented to Charlemagne by Harun al-Rashid, 12 doors in the dial opened respectively at the hour which they represented; they continued open till noon, when 12 knights issued out on horseback, paraded round the dial, and then returning shut themselves in again. Camus constructed an ingenious toy for Louis XIV, consisting of a carriage drawn by two horses, containing a little figure of a lady with a coachman and attendants. The coachman cracked his whip, the horses moved their legs naturally, and when the carriage arrived opposite the king's seat it stopped; the page stepped down and opened the door; the lady alighted and presented a petition to Louis. The flute-players, the tambour-player, and the wonderful duck of Vaucanson are celebrated for the astonishing ingenuity displayed in their construction. Among the most remarkable automata are the whist-playing and other figures designed by Maskelyne.

Automobile. The word denotes primarily: A vehicle designed mainly for transportation of persons on highways or over unprepared ground, equipped with an internal combustion, hydrocarbon-vapor engine, which furnishes the motive power and forms a structural portion of the vehicle. Secondly, it is used as synonymous with "motor vehicle," denoting a vehicle moved by inanimate power of any description, generated or stored within it, and intended for the transportation of either goods or persons on common highways. As an adjective the word denotes broadly some relation to mechanically-driven vehicles. Even certain railway cars used on short feeder lines in France, Austria, Germany and Italy are known as "automobile railway cars" because they are driven by means of engines of types first used in motor vehicles, and, having passenger or

freight space, also form independent, self-contained transportation units.

The automobile, in the more distinctive primary sense of the word, consists of:

(1) Fuel tank; (2) Carburetter; (3) Engine, with 3a, the Mechanism of the Cooling System, and 3b, the Ignition System; (4) Clutch Mechanism; (5) Power Transmission Mechanism, with 5a, Change-Gear Mechanism, and 5b Differential Gear; (6) Vehicle Frame and Springs; (7) Running Gear; (8) Brake Mechanism; (9) Steering Mechanism; (10) Carriage Work; (11) Lubrication System, and (12) Operating System, including the devices by which the operation of the vehicle is brought under control of hand or foot motions of the driver. These various portions of the automobile form an organic whole, being more or less interdependent, and sharp lines distinguishing one portion from another cannot always be drawn. The classification serves convenience in description, however.

1. **Fuel Tank.**—The source of the power developed by the automobile motor is a liquid hydrocarbon fuel (see HYDROCARBONS), which may be benzene, benzol, gasoline, naphtha, kerosene, crude oil, alcohol (pure or mixed with other hydrocarbons, or water), a solid hydrocarbon, such as naphthalene, that can be liquefied at a low temperature (79° C.), or calcium carbide (see ACETYLENE), throwing off hydrocarbon gas (acetylene) when moistened. In order to be utilized, the liquid fuel must be transformed into vapor, the vapor mixed with oxygen or atmospheric air, and the mixture ignited. Aside from the process of generating an unstable gas by vaporizing the fuel, the principle of the automobile motor is identical with that of the gas engine operated with illuminating gas (see GAS ENGINE).

The fuel tank is usually made of sheet copper and is provided with internal bulkheads to obviate swashing of the liquid. It should have as few seams as practicable, the solder should contain no ingredient soluble in the liquid the tank is intended to contain, and it should be mounted on a rigid foundation to obviate torsion, from which leakage might result. In most gasoline tanks a small air vent in the screw cap by which the charging aperture is closed permits the liquid to be drawn off gradually by gravity through a pipe leading to the carburetter. But the same air vent, if left open, causes loss of fuel by evaporation. By a more modern arrangement a small quantity of exhaust gas is piped into the tank at each exhaust stroke, supplying sufficient pressure to feed the fuel, even if the tank is below the level of the carburetter.

2. **Carburetter.**—Early carburetters were spacious and situated at some distance from the motor, connected by a pipe often 12 to 18 inches long and containing a diaphragm of wire gauze to prevent a flame from accidentally striking back to the vapor and liquid contained in the carburetter. Air was let into the latter from the atmosphere and brought in contact with a considerable area of the liquid (then always benzene, gasoline or naphtha), from which vapor was absorbed either by simple surface evaporation, or by forcing the air through the liquid, or by passing the air at high velocity through a narrow channel containing a wick saturated with the liquid. In all cases the suc-

AUTOMOBILE

tion stroke of the motor piston caused the air current.

The composition of the mixture drawn into the cylinder, to be fired, was regulated by an additional air channel leading direct from the atmosphere to the induction pipe. In warm and dry weather the duct leading through the carburetter was contracted and the direct air admission opening was enlarged, while in cold and damp weather this adjustment was reversed. The object was to obtain an explosive charge of unvarying quantity and composition for a motor intended for constant speed and power development, all necessary changes in vehicle speed being effected through the power-transmission gearing. In raw weather ice (from atmospheric moisture precipitated on the metal cooled by the evaporation of the fuel)

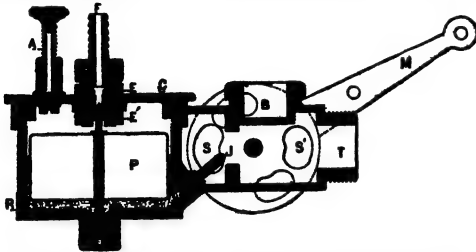


FIG. 1.—SIMPLE MODERN CARBURETTER, WITH AUTOMATIC ADJUSTMENT ACCORDING TO THROTTLE OPENING.

A, Floating plunger. B, Inspection screw to T. C, Cap carrying float feed adjustment. EE', Lock nut to V. F, Gasoline admission pipe. J, Gasoline nozzle. M, Regulating lever having disks formed with two openings to accord with S and S', in wall of mixing chamber. P, Float. R, Float chamber. SS, Air inlets. T, Induction pipe, to engine.

was frequently formed in the carburetter and induction pipe, clogging them. By degrees the method of heating the air, by passing it around the exhaust pipe, was learned, and all pipes were shortened. Still, starting a "cold" motor was an uncertain operation, often requiring preliminary heating of the metal, as it still does (1904) when the heavier oils are used as fuel.

The evolution of the modern carburetter was brought about by the necessity of regulating the force of explosions by a throttling system, to relieve the operator of frequent mechanical gear changes. The steps in this evolution were many and irregular, the most important one consisting in the employment of a nozzle from which the liquid fuel is drawn off in a spray by air suction, to take the place of surface evaporation. Thus the quantity of fuel introduced in each explosive charge is regulated by a mechanical factor which is under control, namely, the air current created by the suction stroke, and not materially affected by temperature and atmospheric conditions. This system requires a modification, however, because an air current will suck liquid gasoline from a nozzle placed in its path in proportion to the square of the velocity of the current (approximately), while the power developed is in simple proportion to the velocity of the piston. An automatic device is therefore required for reducing the air current which draws the spray of fuel, while increasing the current of atmospheric air when the motor speed is being raised, and *vice versa*. The difference in devices serving this purpose constitutes the main difference in carburetters.

3. *Engine*.—In adapting the gas engine to the automobile the first requirement, after devising the carburetter, was the reduction of weight and bulk. The heavy foundation and heavy fly-wheel were undesirable. A small cylinder with a piston working at high speed was preferable to a larger cylinder working with low compression and small piston speed. When weight was cut down and compression of the explosive charge was increased, it was found that the rapid succession of explosions shook the engine and vehicle in a manner destructive to the mechanism and disagreeable to the occupants of the vehicle. By lightening reciprocating parts of the engine, distributing the weight of rotary parts equally with relation to the axis of revolution, by building engines with two, three or four cylinders instead of one, and balancing the explosions in one cylinder against those in an opposed cylinder, but most of all by learning to graduate the volume of the explosive charges according to the requirements for power, excessive shaking and vibration were in course of years considerably reduced.

Equally good results have been obtained with cylinders lying horizontally and standing vertically, the former being more readily "balanced," the latter more easily inspected and repaired. Automobile motor cylinders are made of cast iron, seldom of steel. The pistons are of the trunk pattern, fitting loosely in the cylinders. Circumferential grooves in the pistons contain split steel rings (usually two or three at the upper and one at the lower end) formed

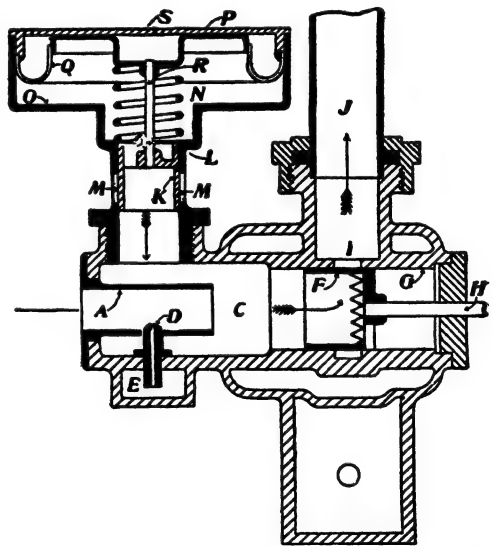


FIG. 2.—COMPLICATED MODERN CARBURETTER, WITH AUTOMATIC ADJUSTMENT ACCORDING TO THROTTLE OPENING AND PISTON SPEED

I, inlet to induction pipe I to cylinder. F, throttle piston (to uncover aperture I more or less) actuated by rod H to governor. D, gasoline spray nozzle communicating through E with gasoline float chamber (not shown). A, air inlet. M, additional air ports more or less uncovered by piston K, held in normal position by spring N and diaphragm P, rigid, and Q, flexible. S, pinhole vent, moderating action of spring N.

and tempered to expand snugly against the cylinder wall. The high temperature produced in the cylinders by the successive explosions of

AUTOMOBILE

charges compressed 75 to 100 pounds per square inch before ignition preclude the use of packed fits.

Throttling of the explosive charge is accomplished by obstructing the induction pipe between the inlet valve and the carburetter nozzle by means of a butterfly valve, or in any other suitable manner. Excessive speed of the motor under light load or when running idle is obviated by a centrifugal governor acting usually upon the throttle valve, but in some instances upon the exhaust valve. In small motors the inlet valve is usually automatic, opened by the suction in the cylinder against the resistance of a helical spring as in a gas engine; in large motors the inlet valve is frequently actuated from the cam shaft, as is the exhaust valve when opening, and with this construction throttling of the motor is sometimes effected by shutting the inlet valve before the suction stroke is completed.

In four-cylinder motors reduction of the

Mufflers—When the burnt gases are exhausted from the cylinder they are still of high temperature and of high tension and their escape into the atmosphere is therefore accompanied by a report-like noise. To subdue this noise a muffler is employed, consisting of an expansion box through which the gases must pass and in which the current of the gas is partially obstructed and subdivided. One of the most efficient mufflers consists simply in a box filled with parallel plates turned edgewise against the current of gas.

3a. *The Ignition System*.—When the mixture of gasoline spray and air (usually heated by contact with the exhaust pipe) reaches the inlet valve of each cylinder, the fuel is partially or wholly vaporized and absorbed in the air current. Entering the cylinder, some recondensation takes place if the cylinder walls and piston are cold (as at the start), but the next piston stroke compresses the charge to a small volume (usually $\frac{1}{4}$ to $\frac{1}{5}$ of the whole cylinder volume),

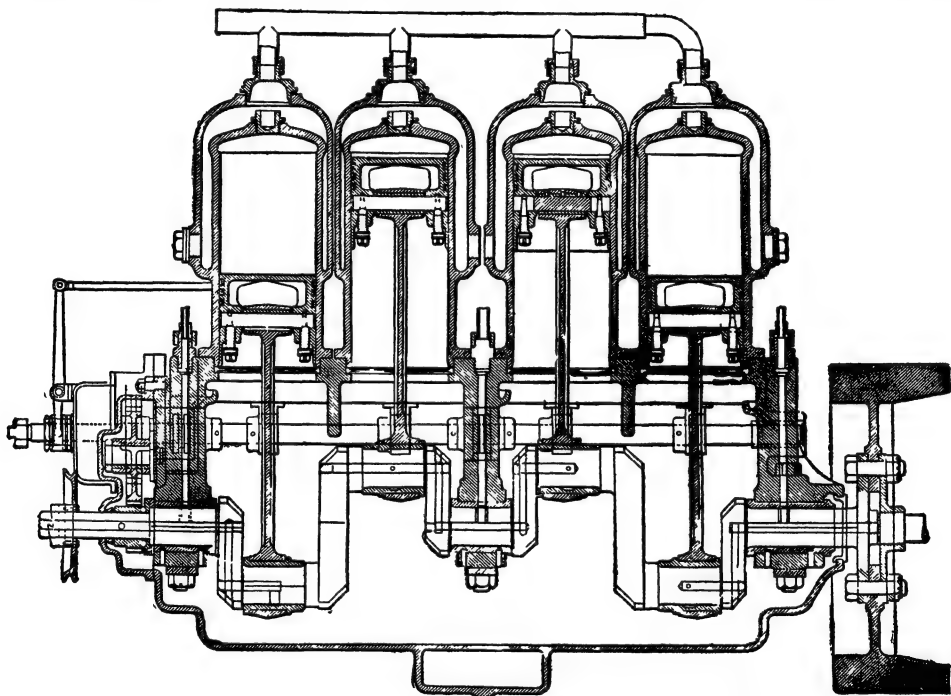


FIG. 3.—LONGITUDINAL SECTION THROUGH FOUR-CYLINDER MOTOR AND FLYWHEEL CLUTCH.

power development was until 1902 commonly effected, when required, by preventing ignition in one or two of the cylinders, and also by shutting the exhaust valve before the exhaust stroke was completed, thereby setting up internal resistance and also reducing the volume of the next explosive charge, while changing its composition by mixing it with the remaining exhaust gases. These methods are now (1904) almost abandoned. The earliest means of reducing the effective power of the motor consisted in retarding the ignition, so that the combustion would not be finished when the exhaust valve was opened. This method is still generally used, but only as an auxiliary to the throttling of the explosive charge.

and thereby heats its and prepares it for ignition. The means employed for igniting the charge consisted at first altogether, and still occasionally, in a kerosene lamp (later pattern: an alcohol vapor lamp) over the flame of which (later: in the flame) a platinum tube was screwed into the upper end, or combustion chamber, of the cylinder. The outer end of the tube was closed and brought to red heat or incandescence by the flame.

By the compression stroke a small portion of the charge was forced into the tube and fired back into the cylinder when it reached the hot portion of the tube. The ignition took place at the highest compression or slightly earlier or later, varying according to the piston speed,

AUTOMOBILE

but the variation was insufficient to give the highest power at the highest piston speed and yet not too early for low speed, because the whole charge should be aflame and expanding with maximum force shortly after the power stroke has begun and, when the piston moves with high velocity, this cannot be accomplished unless the ignition begins long before the compression is at its maximum, the time required for spreading the flame being almost constant for a vapor mixture of given composition.

The method was also unadapted for a motor in which the new throttling system introduced

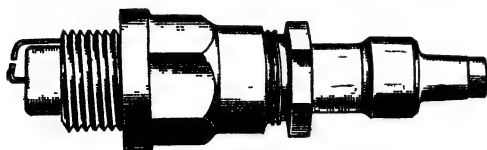


FIG. 4.—JUMP SPARK PLUG.

variations in compression, and the open flame of the lamp was a source of danger in case of gasoline leaks or road accidents. So, when the throttled fuel admission came in vogue, "hot tube" ignition, despite its reliability, was gradually abandoned in favor of the electric spark, produced internally in the cylinder head by (1) a dry battery; (2) an induction coil (see INDUCTION), causing a high-tension current; (3) an interrupter or "trembler," and (4) a switch turning the current off and on at the proper time, operated from the same camshaft from which the exhaust valve is opened. A "spark plug" contains the two terminal wires, insulated by porcelain, lava or pressed mica within a hollow metal screw plug, and is screwed into the cylinder head. The terminals are about 1-16 inch part, and this is the length of the "jump

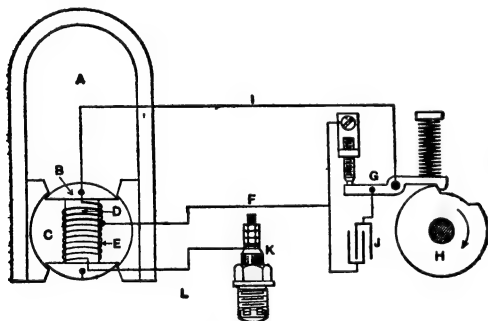


FIG. 5.—DIAGRAM OF MAGNETO SYSTEM FOR IGNITING EXPLOSIVE VAPOR MIXTURE BY PRIMARY CURRENT JUMP SPARK.

A, permanent field magnets; B, armature of H-section; C, armature coil wound in two sections, D and E, connected in series; F, wire to one terminal of circuit breaker G, worked by cam H; I, grounding wire from other terminal of G to metal of armature and thence on to metal work of motor and vehicle; J, condenser in parallel with G; K, spark plug, wired from E's outer terminal.

spark." The metal mass of the vehicle frame serves to "ground" the current. The wiring throughout is insulated. Instead of a jump spark a "hammer spark" or a "wipe spark" may be used.

The main drawback to this arrangement arises from the fact that the life and potentiality

of dry batteries vary greatly, so that they often fail unexpectedly. Storage batteries are used in their place in many European automobiles, but these, too, eventually give out and must be recharged. A dynamo, however, driven by the vapor engine, furnishes a current for ignition so long as the mechanism remains in order, rendering the ignition an automatic function. While the other methods remain in extensive use, the dynamo driven by belt or gear from the motor shaft, is fitted to most high-powered automobiles, especially in the form known as the magneto.

3b *The Cooling System.*—Part of the heat generated by the explosions is transformed into the work of driving the piston, but a large portion is absorbed as heat in the piston, cylinder walls, valves, etc. These, unless artificially cooled, become so hot as to ignite the lubricating oil, and also the next explosive charge before the piston is in position to receive a new impulse. Such premature ignition drives the piston back in the direction opposite that desired and stops the motor. The burning of lubricating oil also leaves a deposit on walls and valves which soon interferes with piston travel, valve action and spark ignition. The means adopted to keep the motor sufficiently cool are in brief as follows:

Small cylinders (up to 2 horse-power) may be ribbed externally, thereby increasing the

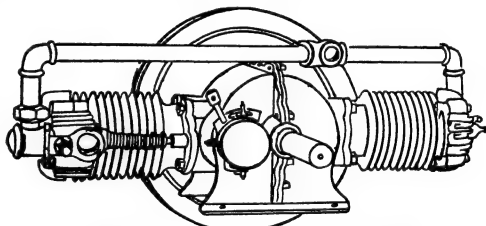
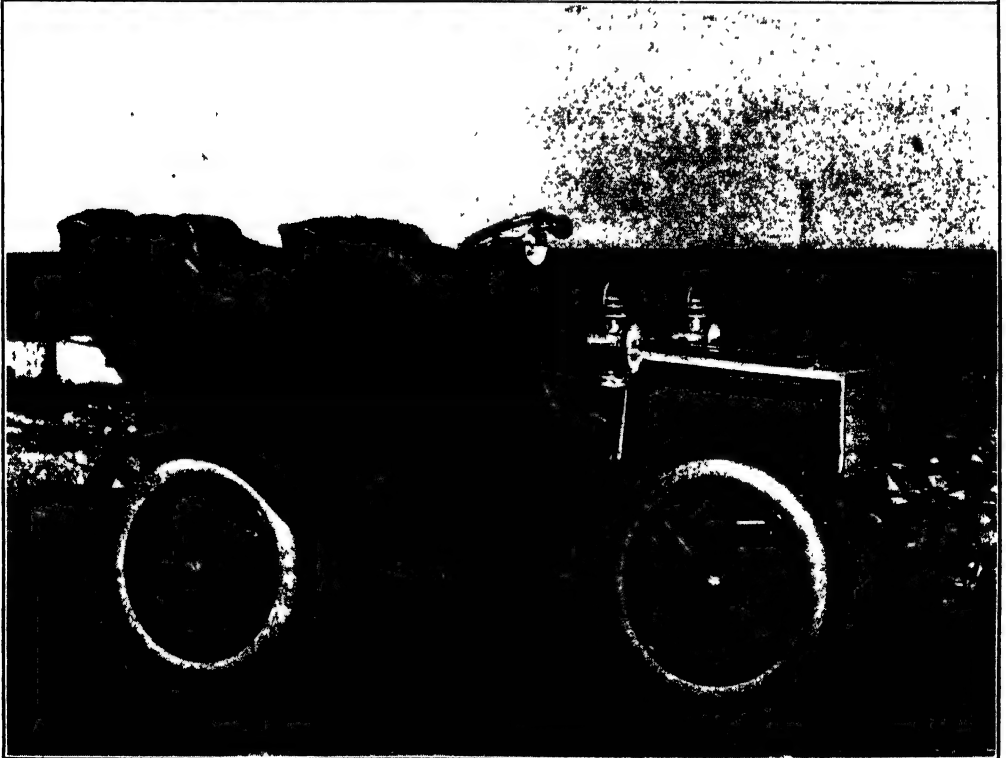
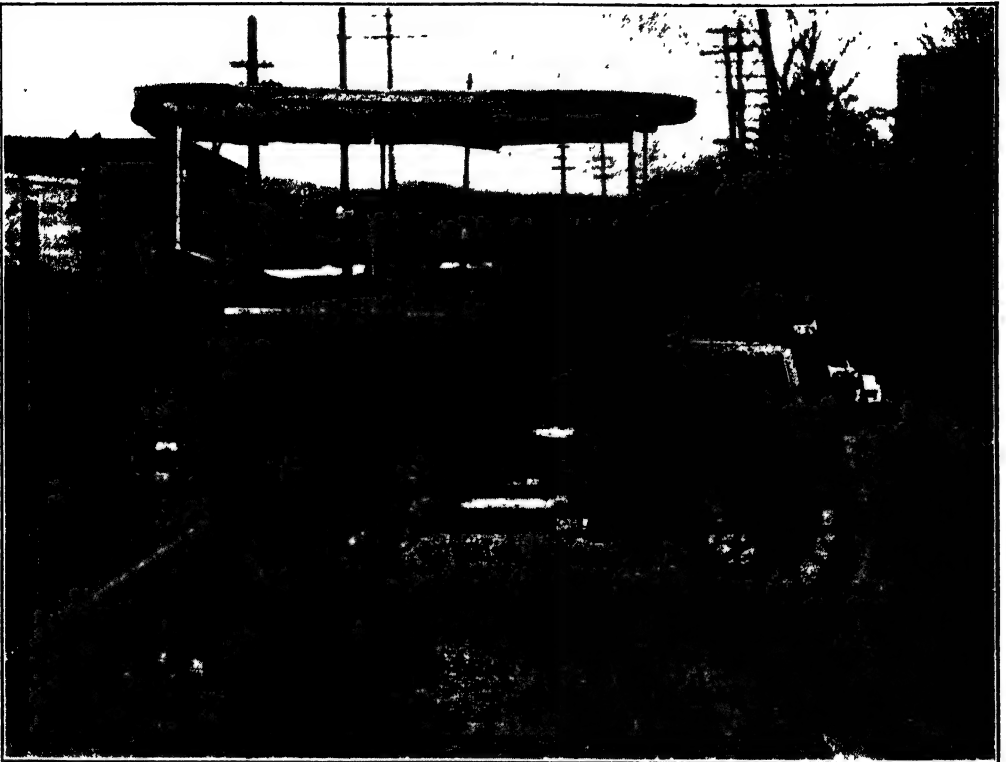


FIG. 6.—HORIZONTAL, TWO-CYLINDER, AIR-COOLED AUTOMOBILE ENGINE.

metal surface, from which heat is lost by radiation and contact with the atmosphere. Rapid motion, constantly bringing fresh cool air to the heated metal, is essential to render this system efficacious. When the motor works at full charges while the vehicle is at rest or moving slowly, renewal of the air must be effected by a blow fan or equivalent means. A few automobiles are operated with air-cooled motors; some of them are now equipped with a fan, but until recently the motors were usually shut down when the cars were at rest, and the vehicles are not adapted for heavy, slow work. The smaller each cylinder, the more acceptable the air-cooling method, because a small cylinder has more radiation surface in proportion to the volume of vapor burned than a large cylinder.

Ordinarily the automobile cylinder is kept at the proper temperature by means of a "water jacket" surrounding cylinder and valve chamber, a water circulating pump (driven from the motor shaft) and a "radiator" consisting of a nest of coiled tubes. The latter are strung with metal fins, soldered on, to increase the radiation area. A water tank is connected with this system. The order of circulation is from water jacket through pump to radiator, thence to the tank and back to the water jacket. The pump

AUTOMOBILES.



GASOLINE TOURING CARS.

AUTOMOBILE

is usually of the centrifugal class, sometimes "rotary" (see PUMPS), and in a few automobiles is omitted, circulation in that case depending solely upon the difference in temperature between the water in the jacket and that in the radiator, the latter being unusually large.

By increasing the dimensions of the pump, to produce more rapid circulation, and reducing the diameter of radiating tubes while increasing their total radiation surface, the amount of water to be carried and the capacity of the tank, have been gradually diminished. With the so-called "honeycomb" coolers the water tank is almost dispensed with, consisting of only two small compartments framing a network of flattened tubes erected in front of the motor, through which air is drawn rapidly by means of an exhaust fan, usually forming the spokes of the engine fly-wheel. The air current in this case is defined within a closed motor hood. In other cases the hood is provided with slits. In the winter when water might freeze and burst water jacket, cylinder or radiator, calcium

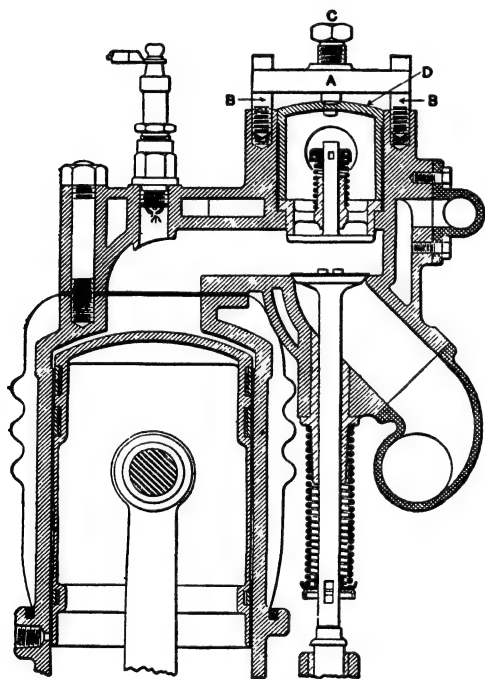


FIG. 7.—LONGITUDINAL SECTION OF VERTICAL CYLINDER WITH CORRUGATED SHEET COPPER WATER JACKET.

Showing also Trunk Piston with piston rings, combustion and valve chamber with spark plug, inlet and exhaust valves with springs and exhaust pipe.

chloride or glycerine is admixed to lower the freezing point, or a special oil distilled from crude petroleum is used instead of water.

The water jackets were up to 1903 commonly cast integrally with the cylinders, cylinder heads and valve chambers, but the difficult cored castings were often faulty, especially when only cylinder heads and valve chambers were jacketed. More recently sheet copper has been secured to flanges on the cylinders, etc., so as to form a jacket between the copper and the plain cylinder casting, and weight reduc-

tion as well as some elasticity (affording security against accidental freezing of the water) have been gained thereby, while the quality of castings has been improved.

4. *Clutch Mechanism.*—A vapor engine, like the gas engine, must be started by hand power, or auxiliary power of some kind, as no power is stored in it while at rest. It cannot be started, therefore, under load without an inconvenient effort, and every automobile vapor engine (excluding those used on motor bicycles and motor boats) is arranged to be started running idle to be subsequently connected with its load by a clutch. Often there is a separate clutch for each rate of gear reduction. In earlier automobiles this was the rule, while now (1904) it is the exception. All the various forms of clutches used in other branches of mechanical engineering have been tried on automobiles, all being more or less perfectly adapted to the requirements: That they shall grip a motor shaft revolving at high velocity without sudden seizure; that they shall be automatically self-adjusting to wear within a considerable range and further adjustable by a screw or other convenient means; that the clutch surface shall be large enough and smooth enough to obviate injurious heating when slipping, and that the release shall be positive, without requiring much physical effort.

The clutch most commonly used in those automobiles having the motor shaft disposed longitudinally of the vehicle, consists of a male truncated cone (angle 10 to 12 degrees), engaging a corresponding female cone formed in or attached to the rim of the motor flywheel. The male cone is leather faced, and is secured, slidingly, to the transmission gear shaft, a strong helical spring pressing it forward (or, in later construction, drawing it back) into the female cone. To secure concentricity of the two cones the transmission gear shaft is usually journaled in the end of the motor shaft (carrying the flywheel) by a ball bearing, and end thrust at this point is obviated in modern design. The engagement of the clutch is effected by a clutch lever which releases the spring, permitting the cones to come together. The same action usually releases one set of brakes, which is intended to be used only when the motor is disengaged from the driving gear. After disengaging the clutch it requires a further movement of this lever to set these brakes.

5. *Power Transmission Mechanism.*—In starting a heavy car from a standstill by clutching a rapidly revolving motor shaft, there would be danger of breaking the connections between the clutch and the rear wheels (which are the driving wheels in nearly all automobiles, so far), or of stopping the motor by the resistance, unless the latter were reduced by gearing permitting the vehicle to move slowly while the motor shaft revolves at high velocity. As motor power is proportional to motor speed, under a given load, the necessity for at least one gear reduction between motor shaft and driving wheels remains, even with modern motors capable of being throttled to low speed, the power of the higher speed being frequently required for overcoming the inertia of the vehicle—on hills, for example.

As a matter of fact, most heavy automobiles have three geared driving connections and one

AUTOMOBILE

direct connection for going ahead, and one geared connection for driving backward, while lighter vehicles have one gear reduction for going ahead and one for reverse, besides the direct drive ahead. In all cases the motor speed alone determines the power available at the moment, and the motor speed in conjunction with the driving gear employed determines the vehicle speed. The art of driving an automobile consists largely in using the smallest gear reduction (the "highest gear") and the smallest motor speed that, combined, will produce the desired vehicle speed. Before motors could be throttled to give a wide range of power development, the art of driving consisted largely in the manipulation of the levers by which the gear reduction was changed. The development has been from gear control of the vehicle to throttle control of the motor; under both methods the brakes are freely used as an auxiliary, especially in congested traffic.

Hundreds of transmission systems have been, and are, in use, and are described in textbooks on the subject. The mechanical elements of which they are composed are mainly those well known in machine tool practice: the belt,

principle is the "expansion pulley" belt transmission system, which also takes the place of all change-gear mechanism. Only one belt is used, which has broad chamfered edges and transverse reinforcing strips sufficiently rigid to permit the belt to ride mainly on the edges over V-pulleys of changeable diameter. When the driving pulley is expanded the driven pulley is correspondingly contracted. The gear ratio may in this manner be altered by insensible graduations. See PULLEY.

Fig. 9 shows one pattern of power transmission in a vehicle with a transverse motor shaft. Fig. 10 shows the system of bevel-gear transmission, through change-gear mechanism, to a differential gear on a countershaft and sprocket-and-chain transmission from the ends of the latter to the rear wheels, the rear axle being fixed. Fig. 11 shows the system of bevel-gear transmission, through change-gear, to a differential gear on a divided rear axle which revolves and turns the wheels keyed to it. In modern construction of this type the rear driving axle is relieved of the support of all weight, being contained within a tubular supporting axle, brazed or bolted to the differential

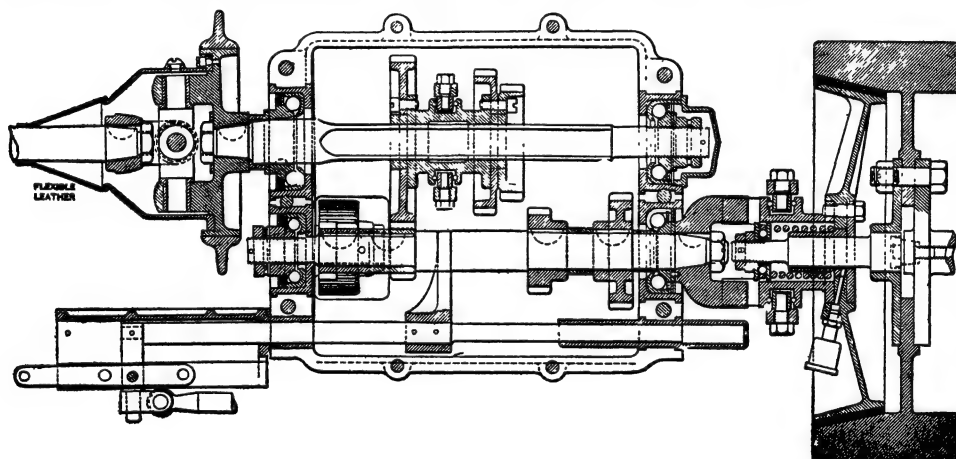


FIG. 8.—CONE CLUTCH (to the right), SLIDING GEAR MECHANISM
AND UNIVERSAL JOINT (to the left) TO
BEVEL-GEAR SHAFT.

spur wheel, bevel gear and shaft, the countershaft, sprocket wheel and chain. From 1886 to 1902 belts were employed to transmit power from a transverse motor shaft to a parallel countershaft in automobiles evolved from the model first designed and built by Karl Benz, of Mannheim, Germany, in 1886. By a series of stepped pulleys, any pair of which could be clutched and keyed to the shafts, respectively, this belt system served also as engagement clutch and change-gear device. In commercial competition with toothed-gear transmission, patterned after the vehicle designed by Gottlieb Daimler, of Cannstatt, Germany, also in 1886, the belt system gradually lost favor, probably more by reason of the energy and ingenuity applied to the general improvement of vehicles equipped with tooth-gear transmission and change-gear devices, than owing to any intrinsic superiority of the gear drive. For the present (1904) belt transmission is practically abandoned. A surviving adaptation of the

gear casing, on the ends of which the wheels are mounted by ball or rolling bearings, while the driving-axle-ends are keyed to the external faces of the wheel hubs.

5a. *Change-Gear Mechanism.*—The primitive change-gear included a clutch or key for each gear ratio. With numerous variations, the general principle is as follows: To the transverse motor shaft, prolonged beyond the fly-wheel, are rigidly secured spur wheels of varying diameter. On a parallel countershaft are mounted other spur-wheels meshing pairwise with those on the motor shaft, but free to rotate around their own shaft, instead of with it, unless clutched. To a small spur wheel on the motor shaft corresponds a large one on the countershaft, and this combination produces, of course, the low countershaft speed which can be still further reduced by transmitting the motion from a small sprocket wheel at the end of the countershaft to a larger one on the rear wheel of the vehicle.

AUTOMOBILE

Suppose the speed is divided by five from motor to countershaft and further divided by three by the sprocket chain ratio, the total reduction is then from 15 to 1; the wheel revolves once for fifteen revolutions of the motor shaft. The vehicle speed will further depend upon the diameter of the rear wheels. If this is about 34 inches, making the circumference about 9 feet, and the motor shaft revolves 900 times per minute or 15 times per second, the rear wheels, revolving once per second, will advance the vehicle 9 feet per second or 540 feet per minute. In ten minutes the car will have traveled 5,400 feet, or somewhat more than a mile, corresponding to between 6 and 7 miles per hour. By throttling the vapor admission the motor speed may be reduced to 200 revolutions per minute, reducing the vehicle

time. Modern developments of this system are much simplified, mainly by the employment of epicyclic gears (see EPICYCLIC GEAR).

The change-gear system which was developed when the engine was placed in the front portion of the vehicle with the motor shaft in the plane of the lengthwise axis, was designed to reduce noise, wear and waste of power, by having only one pair of spur wheels in mesh at one time. It is known as the clash-gear or sliding-gear system (see Fig 8). The shaft carrying the cone clutch has a universal joint coupling it to a shaft in prolongation of it, the latter carrying spur wheels of different diameter rigidly secured. It is journaled in an oil-tight casing hung in the vehicle frame. Lower in the same casing is journaled a parallel squared shaft carrying a slidable sleeve with rigidly secured

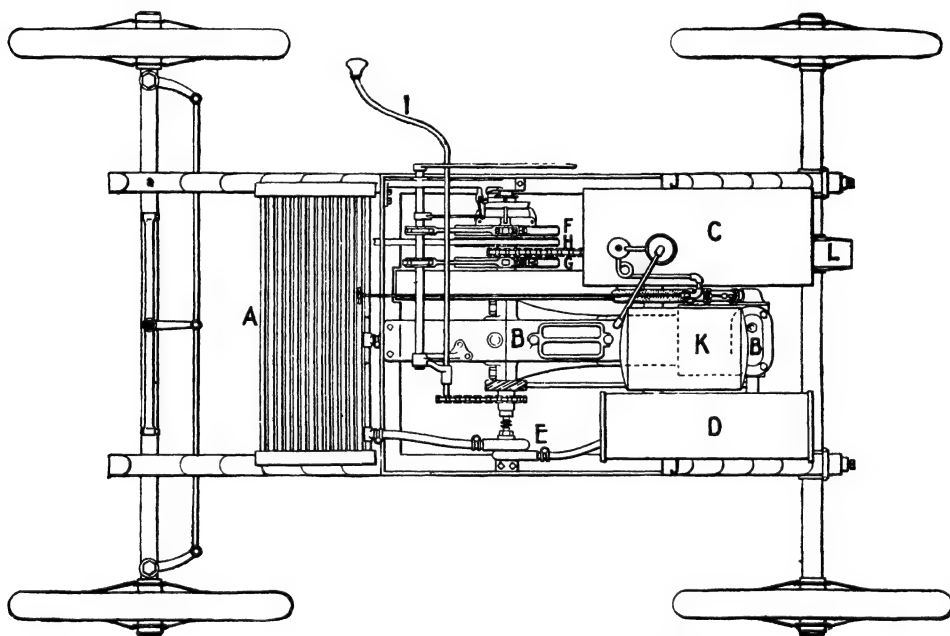


FIG. 9.—PLAN VIEW OF AMERICAN AUTOMOBILE "RUNABOUT"
MECHANISM.

With Transverse Engine Shaft, Horizontal Single-Cylinder Engine, Change-Gear by Brake Clutches and Epicyclic Gears and Side-Spring Vehicle Frame. Steering wheel, pillar, and gear not shown.

A Radiator.
B Engine.
C Gasoline tank.
D Muffler.

E Water pump.
F-G Clutches.
H Chain.
I Starting crank.

J-I Side springs.
K Water tank.
L Differential.

speed to $1\frac{2}{3}$ miles per hour. In early automobiles, where throttling was not so effective, the brake served to reduce the motor speed by increasing the resistance.

While one pair of spur wheels drives, the several other pairs are, with this system, in mesh, but revolve idly. This accounted largely for the metallic noise of the earlier models. One of the pairs of spur wheels was not strictly in mesh but a small intermediate pinion on a rock shaft transmitted the motion to the spur wheel on the countershaft, thereby reversing its direction and causing the vehicle to be driven backwards when the clutch was applied to this purpose. Clutch levers and change-gear levers were identical, and were so interlocked that only one clutch could be set at one

spur wheels so disposed that, in one position of the sleeve, none of these spur wheels is in mesh with any of those in the fixed, upper shaft. But when a fulcrumed fork, acting against a flange of the sleeve causes the latter to slide a short distance, one pair of gears, say, the lowest gear, are engaged. A further motion in the same or the opposite direction, releases the low gear and engages the second gear. A still further motion releases the second and engages the third; and in the same manner the fourth and the reverse are engaged and released. A small pinion on a special rock shaft produces the reverse, as in the older system. The edges of the spur teeth are rounded to facilitate meshing, and the cone clutch is automatically released while a change of gear is made; yet it

AUTOMOBILE

requires rapid and resolute manipulation of the change-gear lever (or levers) to avoid burring of the spur wheels.

Ingenious arrangements are made in many cars to have consecutive motions of the gear lever produce a consecutive transition from the lower to the higher gear, and *vice versa*. In some cases the upper shaft is divided into two portions, the rear one of which, in its foremost position, grasps the front portion by a hollow square while all spur wheels are disengaged, thereby transmitting power direct from the motor shaft to the differential gear without speed reduction. The advantage is always bought at the cost of more gear complications for the lower speeds.

5b. *Differential Gear*.—This apportions motion between the two rear wheels, permitting one to revolve faster than the other, as at turns, where the outer wheel describes a longer curve than the inner one. The differential gear used in automobiles was at first the same as used in other mechanical constructions (see DIFFER-

machine portions of an automobile has been realized only by degrees. The small motors of early vehicles were mounted either in the wagon box at the rear of the seat (only one seat), with two radius rods running from the motor shaft to the rear axle (so as to keep the sprocket chain at even tension, or on a rigid frame of angle iron or steel tubes extending from the rear to the front axle. The latter method survived in a few instances up to 1900 and is now (1904) observed only in some heavy vehicles intended for slow hauling of goods, in which the absence of spring suspension for the motor mechanism is not so injurious as in fast-moving cars. Metal reaches between the two axles, serving merely to brace the construction, survived longer, but finally disappeared with the general adoption of a rigid steel frame supported by four semi-elliptical springs and carrying the entire mechanism as well as the vehicle body. Some notable American exceptions to this rule have inverted elliptical springs transversely in front instead of the two semi-elliptical springs,

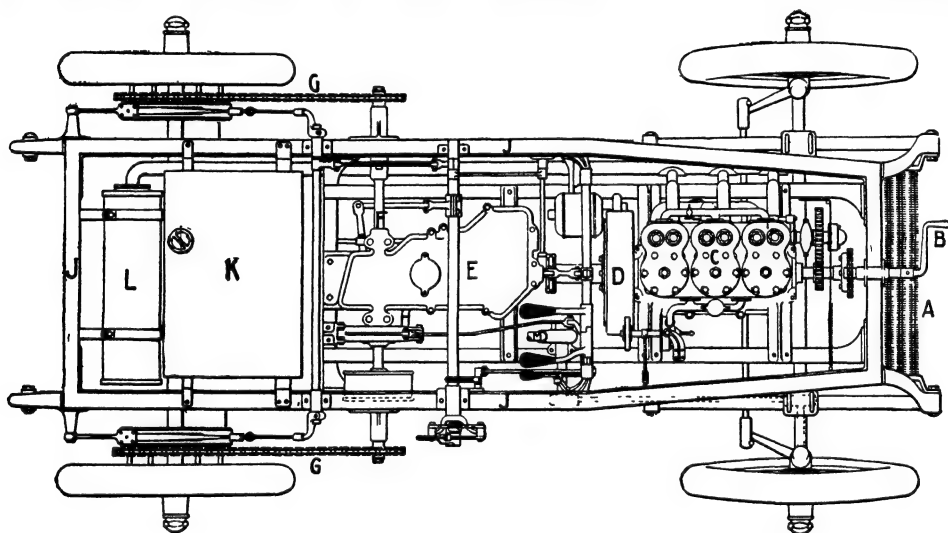


FIG. 10 — PLAN OF AUTOMOBILE "CHASSIS" OF TYPE COMMON
FOR "TOURING CARS."

With 3-cylinder engine, longitudinal shaft, cone clutch, clash change-gear, sprocket chain drive from countershaft to rear wheels. Steering wheel, pillar, and gear not shown.

A Radiator.
B Starting handle
C Motor.
D Flywheel.

E Change gear case.
F Counter-shaft.
G-G Side chains.

H Band brake.
J-J Sides of frame
K Gasoline tank.
L Muffer.

ENTIAL GEAR), consisting of two bevel-gear plates, of equal diameters, mounted on the contiguous end portions of the divided shaft, designed to be revolved, and four bevel-gear pinions journaled radially between the two gear plates and meshing with them. Motion transmitted to the ring holding the outer ends of the pinion shafts, cause both bevel-gear plates to revolve equally, unless one resists more than the other, in which case the small pinions revolve and permit the plate which moves easier to move farther. In the United States a form of differential gear was developed in connection with automobiles, in which straight spur wheels and pinions took the place of bevel-gears.

6. *Vehicle Frame and Springs*.—The need of a special metal frame for supporting the

giving the front axle more freedom to oscillate, as required when traveling over rough ground. Many popular small American automobiles form another exception, having the entire frame secured by clips to the inactive middle portions of two side leaf-springs, whose bent-down rear and front portions are secured to the rear and front axles, respectively (see Fig. 9)

At first most frames were made of wood or drawn steel tubes brazed together (an adaptation from bicycle construction). Subsequently greater rigidity was attained by armoring the wood with steel flitch plates, or by the use of structural iron or steel in various shapes, bolted and riveted together. This was convenient for experimental work, changes being easily effected. When the types of vehicles became more defi-

AUTOMOBILE

nitely accepted, frames pressed in one piece from large blanks of sheet steel made their appearance. In a few cases pans of sheet steel joined the side reaches forming a protection underneath against mud and dust.

The springs used in automobiles are generally common carriage leaf springs calculated for such weights as they are intended to support. In course of time their length and weight have been gradually increased, with a view to combining strength with great flexibility. In case of side springs extending from axle to axle, as referred to above, this tendency influenced and modified the general design of the vehicles.

7. *Running Gear.*—In this division may be included axles, wheels and tires. Nearly all early automobiles (1890 to 1898) were equipped with wire-spoke wheels, the spokes laced tangentially to the hub on the suspension principle borrowed from bicycle construction. These wheels have given way to stout wood wheels, seldom more than 34 inches in diameter, built around a metal hub and enclosed in an iron ring to which a solid or inflated rubber tire is attached. The pneumatic or air-inflated rubber-covered canvas tire is used almost exclusively for pleas-

selves readily to traction from one motive centre, but front wheels are sometimes arranged to revolve in a slightly inclined (2°) plane, with a view to facilitating the steering operation by bringing the ground contact of the wheel directly under the pivot pin, a design of special value on rough ground where slanting impacts at the wheel rim would otherwise tend to turn the wheel or strain the steering gear.

The front axle of automobiles is stationary and frequently bowed down at the middle to permit a low position of the motor. To each end, just beyond the spring clips, is brazed a "knuckle" or fork, in which is journaled a pivot pin carrying at right angles, or slightly inclined, the rock shaft around which the front wheel revolves, usually on ball or roller bearings. The pivot pin is mounted in end-thrust ball bearings. Each pivot pin carries, besides the wheel shaft, a lever arm, projecting either forward and slightly outward, or rearward and slightly forward. The arms are connected by a rod, synchronizing the turning of the two wheels. The steering gear acts upon this rod or upon an additional arm on one of the pivot pins. The "fifth wheel" device has never been generally

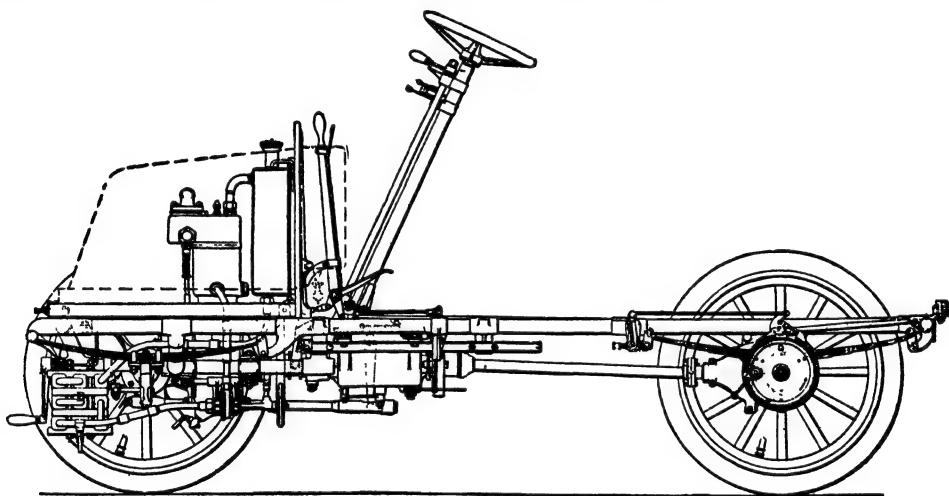


FIG. 11.—SIDE ELEVATION OF AUTOMOBILE CHASSIS.

With bevel-gear driving shaft from change-gear to differential gear on special rear driving axle separate from the rear supporting axle of the vehicle.

ure automobiles, and its maintenance involves from 25 per cent to 50 per cent of the cost of operating a vehicle. On the other hand, air-tires afford a cushioning action, supplementary to that of the carriage springs, which protects machinery and wheels, especially against lateral shocks, in a manner for which no substitute has been found for vehicles intended for a speed above 15 or 20 miles per hour. At such and higher speeds the tire resiliency is characterized by the avoidance of vertical recoil.

Automobile wheels are also made of steel tubing, locked and brazed in a steel hub; elastic wheels with S-shaped spokes of tempered metal leaves have been tried, as well as composite wheels involving a cushioning medium between the felloe and the hub. So far (1904) the wheels have not been dished (to gain strength), as inclined or "set" axle ends do not lend them-

used in automobiles, being practical only when steadied with the leverage of a long pole, as in horse-drawn vehicles.

The bearings in automobile wheels were first plain "parallel bearings," then mostly ball bearings. Then followed a reaction favoring plain bearings. Lately ball bearings (in Europe) and roller bearings (in America) are usually fitted and, if well made and calculated for their loads, give satisfaction and reduce traction resistance, besides being more durable than parallel or coned shaft bearings.

Rear axles are either stationary (solid, tubular or H-shaped), carrying wheels revolved by sprocket wheels and chains, or rotary and divided near the middle by the differential gear, the wheels keyed to the axle ends and the bearings clipped to the vehicle springs. It was early found, however, that an axle supporting the

AUTOMOBILING

greater portion of the vehicle's weight should not be subjected to the alternating stresses resulting from rotation, unless it was made much stronger, theoretically, than a fixed axle. Gradually the divided and revolving axle was therefore modified until a design was developed separating motive power from support, as explained under Power Transmission.

(8) Brake and (9) Steering mechanism, and also (10) Carriage work are essentially constructed on the same principles in vapor engine automobiles as in motor vehicles in general and are referred to under MOTOR VEHICLES.

11. *Lubricating System*—The lubrication of vapor engines presents certain difficulties caused by the very high temperature of pistons and cylinder walls, and the liability of fouling valves and spark points if an excess of lubricant is used. A thin oil of high flash and ignition test is the chief requirement. The mercantile method of placing different oils on the market under the same name, and the same oil under different names (allowing agents to name it), has obscured lubricating problems and retarded uniformity in practice. With vertical cylinders it is customary to place a quantity of oil in the crank casing and depend upon lubricating the cylinder and con-

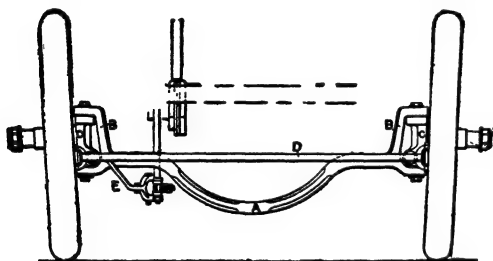


FIG. 12.—ELEVATION OF AUTOMOBILE FRONT AXLE WITH KNUCKLES, STEERING PIVOT PINS, AND INCLINED WHEEL SHAFTS.

A, Front Axle; BB, Knuckles, CC, Pivot pins; D, Rod connecting arms on pivot pins, E, connection from arms to steering gear (not shown).

necting rod by the oil splashed from the casing by the rotation of the crank. For horizontal cylinders sight feed drip lubricators regulated by hand have been extensively used, as they still are for steering gear, transmission gear and wheel bearings, but the most approved practice demands a force feed system operated from the cam shaft of the engine, so as to proportion the feed to the engine speed.

It is common practice to stuff the change-gear box with grease (vaseline and graphite is a popular mixture) and to use cylinder oil for all other bearings. Mechanical oilers distributing the oil from a central reservoir, often placed on the dashboard, through a system of canalization and by pressure derived from the engine exhaust gas, are generally employed.

12. *Operating System*.—The devices by which the operator of an automobile controls the motor, clutch or clutches, the change-gear, brakes, steering wheel and the lubrication system have undergone many changes and remain much diversified. The starting device is nearly always a detachable crank fitting the squared end of the motor shaft, either in front of the vehicle or at the side. The motor, when started, automatically releases the crank, the turning of

the shaft pushing the crank out of engagement by a screw action supported by a spring. In many automobiles a small lug prevents the insertion of the crank if the ignition device happens to be adjusted to give an early spark which would start the piston in the wrong direction, and whereby the crank might be thrown violently back, injuring the starter.

The spark-timing handle and the throttle handle are generally placed close to the steering wheel (or steering lever), while one band brake (usually acting on the circumferential ring of the differential gear), and the cone clutch are actuated by one or more pedals. The change-gear lever (sometimes two) and the brake lever (actuating band brakes contracting around, or expanding into, drums in the rear wheels) usually extend through slots in the footboards, or at the side of the vehicle within convenient reach of the operator's right hand. In a few cases the operating devices are at the left side, the operator's seat being there. Automobiles vary more, perhaps, in the arrangement of operating devices than in any other feature of construction, and a brief general description covering established practice is therefore impossible.

In the broadest definition of "automobile," which is sanctioned by common usage, the word may be applied to any mechanically propelled vehicle, whether the source of power is a vapor engine, or steam engine, an electric accumulator or storage battery, stored compressed air or any other form of primary or secondary generator, but historically the word was not coined or applied until (about 1888, it seems) the appearance in France of benzine vapor engine vehicles, while steam cars for common highways antedate locomotives, having been made, especially in England, before the railways were thought of. The development of electric vehicles also began independently of the vapor engine vehicle. If a distinction should be made between automobiles and motor vehicles—and the distinction would be a convenience in nomenclature—the latter term should be the broader one, including all forms of power, while "automobile" should be reserved for motor vehicles equipped with a vapor-explosion engine and driven by purely mechanical transmission of power from the engine shaft.

In accordance herewith, information in regard to steam and electric vehicles for common roads, as well as vehicles propelled through electric motors deriving their current from either a steam or a vapor engine, will be found under MOTOR VEHICLES.

MARIUS C. KRARUP,

Formerly Editor of 'The Automobile.'

Au'tomo'biling, recreative contests and not commercial value may be fairly credited with having given the automobile its first start in America, for by them it caught public attention. The sight of the horseless machines, with no visible means of propulsion, no rails, no overhead wire, no underground current; out of nothing apparently attaining a speed in the straight on the old Guttenberg Race Track, New Jersey, at the Three Counties Fair in 1893 of over 50 miles an hour, was enough to set tongues wagging, and newspaper reporters agape; and to call upon even the instantaneous photographer for his best efforts. This and similar exhibitions soon led to other and longer



AUTONOMY — AUTREFOIS CONVICT

contests on tracks, to 10-mile tests, to 20, and upward; and from thence to greater and greater distances on the public highways. These competitions eventually divided themselves into two classes; one set to settle the question as to which kind of power could cover the most miles in the shortest time; the other to test which of many could cover the same route under the same conditions, with the least number of mishaps, or stoppage, for any purpose whatever connected with the machine; that is, for repairs, for renewal of power, or from difficulties insurmountable by the particular model and motive power used. Naturally competitions on artificially made tracks with smooth surfaces have produced the most astonishing speed results. Henri Fournier in a gasoline automobile on the Ocean Parkway, Brooklyn, made a straightaway mile in 51½ seconds on 16 Nov. 1901; Foxhall Keene covered the same course in 54½ seconds, and A. C. Bostwick in 56½ seconds. At greater distances equally surprising results have been obtained: Alexander Winton, at Providence, R. I., 24 Sept. 1902, covered 5 miles in 5 minutes 29½ seconds, and at Cleveland, 16 Sept. 1902, 10 miles in 10 minutes and 50 seconds. Fournier covered 20 miles at Fort Erie, 26 Sept. 1901, in 25 minutes and 25½ seconds; and Winton in Chicago, in September 1900, 50 miles in 1 hour 17 minutes and 50 seconds. In road racing, taking the roads as they came, the distance from New Haven to New York, 82 miles, has been covered in 3 hours 10 minutes, and New York to Boston, 225 miles, in 15 hours 11 minutes. The most interesting and trustworthy contest for endurance was that arranged in October 1902 by the Automobile Club of America from New York to Boston and return, in which the speed was limited to 14 miles an hour to conform to the local laws. There were 75 starters, of which 68 completed the round trip. Seventeen received certificates of a perfect record, and 51 received certificates of a speed over 12 and less than 14 miles an hour all through the trip.

Autonomy, the self-government of a state. This power may reside within limited bodies of the same people, such as parishes, corporations, religious sects. These districts or communities may be autonomous, if not absolutely, yet within certain defined limits. They may be said to enjoy a partial, limited, or local autonomy. Autonomy is often used to designate the characteristic of the political condition of ancient Greece, where every city or town community claimed the right of independent sovereign action. Recently the word is more specifically used of territories or provinces, which, while subject in some matter to a higher sovereignty, are autonomous in other respects. Thus the Treaty of Berlin made eastern Rumelia an autonomous province; though subject to the direct political and military authority of the Sultan, it was to have administrative autonomy in all its internal affairs. Egypt possesses a higher autonomy. The self-government enjoyed by the British colonies may be described as a modified form of autonomy.

Autoplasty, a term denoting a method of surgical treatment which consists in replacing a diseased part by means of healthy tissue from another part of the same body. The most

familiar instance is the rhinoplastic or taliacottian operation, for supplying a new nose from the skin of the forehead. It is more popularly known as skin-grafting.

Autoplate, a machine for making and finishing curved stereotype printing plates for use in printing newspapers, invented by H. A. Wise Wood of New York, and first put into use upon the New York *Herald*. This machine, after a flexible papier-maché matrix, made from a type page, is inserted therein, proceeds to cast printing plates, weighing about 50 pounds each, at the rate of four a minute, and to dress their edges and inner surfaces and prepare them for attachment to the printing cylinders, and this is done automatically—all within the compass of one machine. Previous to the advent of the autoplate such work had been invariably done by hand-worked devices, with which the fastest rate of production attainable was at the rate of slightly less than one plate per minute. So great a change did this invention make in the work of stereotyping upon the larger newspapers, that not only was the machine generally adopted, but in every case the hand apparatus were entirely dispensed with, and sole dependence placed upon the autoplate.

Au'topsy, eye-witnessing, a direct observation. The term is generally applied to a post-mortem examination, or the dissection of a dead body.

Au'totype, a method of phototyping. Tissue prepared with a liquid composed of gelatine, sugar, and bichromate of potash, is used for taking a collodion negative in the ordinary way, and is next applied under water with the face down to a plate of glass, metal, or other paper, coated with gelatine and chrome alum. Means are then taken to remove the parts not hardened by light, and, finally, by another elaborate process, the plate is made ready for the printing-press.

Autran, ô-trân', Joseph, French poet: b. Marseilles, June 1813; d. there, 6 March 1877. His verse is admired for its purity of form and refined sentiment. He attracted attention in 1832 with an ode to Lamartine, 'The Departure for the East.' His works include 'The Sea,' poems (1835); 'Milanah,' an epic (1842); 'Rural Life' (1856); and 'The Daughter of Æschylus,' drama (1848), which won a prize from the French Academy.

Autrefois Convict, ô'tr-fwa' kôn-ve', in criminal pleading, a plea made by a defendant indicted for a crime or misdemeanor, that he has formerly been tried and convicted of the same. This plea is similar in form as the plea of *autrefois acquit*, and is based upon the same general principle, to wit: that no man's life or liberty shall be twice put in jeopardy for the same offense. A plea of *autrefois convict*, which shows that the judgment on the former indictment has been reversed for error in the judgment, is not a good bar to another indictment for the same offense. But a prior conviction before a justice of the peace, and a performance of the sentence pursuant to the judgment, constitute a bar to an indictment for the same offense, although the complaint on which the judgment proceeded was so defective

AUTUMN—AVA

that his judgment might have been reversed for error. The New York Code of Criminal Procedure, § 9, expressly prohibits a second prosecution for the same crime. At common law it is necessary, according to the weight of authority in a majority of the United States, to specially plead former conviction or acquittal. In many of the States, however, by statute, the plea of *autrefois acquit* may be taken advantage of under the plea of not guilty. The statute adopted in New York is similar in its terms to that of many other States. It is provided by the New York Code of Criminal Procedure, § 322, that a plea of former judgment of conviction or acquittal of the crime charged may be pleaded with or without the plea of not guilty.

Autumn, the season of the year which follows summer and precedes winter. Astronomically, it is considered to extend from the autumnal equinox, 23 September, in which the sun enters Libra, to the winter solstice, 22 December, in which he enters Capricorn. In popular speech it includes the months of September, October, and November.

Autun, ô-tên, France (ancient *Bibracte*), a town in the department of Saône et Loire, of considerable interest both from its antiquities and from its modern edifices. Of the former the more remarkable are two Roman gates of exquisite workmanship and in good preservation, the ruins of an amphitheatre and of several temples; of the latter the most conspicuous is the cathedral of St. Lazare, a Gothic structure of the 11th century. Pop. (1896) 11,873.

Autunite, a beautiful canary-yellow mineral, occurring in thin, tabular crystals of orthorhombic symmetry, but closely approaching the tetragonal mineral torbernite in form. Both of these minerals are hydrous phosphates of uranium, but while calcium is an essential constituent of autunite, whose formula is $\text{Ca}(\text{UO}_2)_2\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$, it is replaced by copper in torbernite, which is further distinguished by its green color. Autunite has eminent basal cleavage, resulting in a pearly lustre on the basal plane, while on the edges of the crystal the lustre approaches adamantine. It has a hardness of 2 to 2.5 and a specific gravity of about 3.12. Some autunite is beautifully fluorescent. Its name is derived from its most noted locality, Autun, France, where it is found in closely aggregated masses of crystals. Other noteworthy occurrences are in Cornwall, England, in Saxony, North Carolina and South Dakota.

Auvergne, ôvâr'n'y, a province of central France, now included in the departments Cantal, Puy-de-Dôme, and Haute Loire. The mountains of Auvergne are the highest in the interior of France, the highest of them, Puy-de-Dôme, being 4,805 feet above the sea. It is entirely composed of volcanic matter, and has a regular crater 1,000 feet in circumference, and 300 feet deep. The whole of the cones present the same general character—well-defined craters enclosed by regular cones, on whose sides the lava currents may be traced as easily as on those of Vesuvius.

Auvergne, Mountains of, a branch of the Cevennes, chiefly situated in the depart-

ments of Puy-de-Dôme and Cantal (France). The most important peaks are Puy-de-Sancy (6,185 feet), Plomb du Cantal, and Puy-de-Dôme.

Auwers, Arthur, German astronomer: b. Gottingen 12 Sept. 1838. He became assistant in the observatory at Königsberg in 1859, and at Gotha in 1862; in 1866 was made a member of the Berlin Academy and astronomer to it. In his capacity of president of the Astronomical Society he was conspicuously identified with the preparation of the great co-operative catalogue of over 100,000 stars. For his services to astronomy he was made a foreign member of the Academy of Sciences at Washington, from which he also received the Watson gold medal. Among his works are 'Neue Reduktion der Bradleyschen Beobachtungen 1750-62' (1882-8), and 'Katalog von 9,789 Sternen' (1896).

Aux Cayes, ô-kā', a seaport town of Haiti, situated on the southwest coast of the island, about 85 miles west of Jacmel. It has an excellent harbor, a good export trade, and is the seat of an American consular agent. Pop. about 25,000.

Auxerre, ô-sār' (ancient *Antissiodurum*), a town in France, 96 miles southeast of Paris. It is finely situated on a height above the Yonne, which here becomes navigable, but is very poorly built. Its principal edifices are its cathedral of St. Stephen, a splendid Gothic structure, with a finely proportioned interior, and windows containing most beautiful stained glass; the church of St. Germain, with some curious crypts; and a magnificent old episcopal palace, now converted into the Hôtel de Prefecture. The manufactures consist of woollens, hats, wine casks, leather, red and yellow ochre, earthenware, and violin strings; and the trade is chiefly in wood and in the wines of the district. Of these wines the most famous is the white Chablis. Pop. (1896) 15,082.

Auxonne, ô-sün' (Latin *Asona* or *Aussona*), a town in France, 18 miles east-southeast of Dijon, on the left bank of the Saône, here crossed by a beautiful bridge of 23 arches. Auxonne is well built, the seat of a court of commerce, and has a communal college, and a public library containing 4,000 volumes; a castle, an arsenal, and a cannon foundry. Pop. (1896) 6,700.

Auzout, ô-zoo', **Adrian**, French mathematician: d. 1691, inventor of the micrometer, still in use among astronomers to measure the apparent diameter of celestial bodies. He was the first who thought of applying the telescope to the astronomical quadrant.

Ava, ā'va, or **Aungwa**, a town in Asia, the former capital of Ava or Birmah, on the Irrawaddy. It has a circuit of about five miles, and consists of an inner and an outer town, each surrounded by a brick wall. Pop. (1891) 39,477.

Ā'va, Arva, Yava, or Kava (*Piper methysticum*), a plant of the natural order *Piperaceae*, possessing narcotic properties. It is a shrubby plant, with heart-shaped acuminate leaves, and very short, solitary, axillary spikes of flowers. It is a native of many of the South Sea Islands, where

AVADHUTA—AVALON

the inhabitants intoxicate themselves with a fermented liquor prepared from the upper portion of the root and the base of the stem. The rhizome is thick, woody, rugged, and aromatic. The intoxicating liquor is prepared by macerating it in water. The narcotic property is ascribed to an acrid resin, *hawine*, present in the root. The taste is unpleasant to those unaccustomed to it, and has been likened to that of rhubarb and magnesia. The intoxication is not like that produced by ardent spirits, but rather a stupefaction like that caused by opium. It is succeeded by a copious perspiration. The habitual use of *ava* causes a whitish scurf on the skin, which, among the heathen Tahitians, was reckoned a badge of nobility, the common people not having the means of indulgence requisite to produce it. *Ava* is, like cocaine, a local anæsthetic.

Avadhuta, a'va-d'-hoo'ta, a member of a mendicant sect in southern India addicted to self-torture.

Av'anche, a mass of snow or ice which slides down steep mountain slopes. On lofty mountains snow would accumulate indefinitely if the excess were not removed by sudden falls or by glaciers which bring it into the valleys, where it melts. Avalanches may occur at any season of the year, but they are most frequent in early spring after the snow has begun to melt from the sun's rays. The water which collects beneath the snow bank loosens it from the ground, and the whole mass may then be precipitated to the base of the mountain. Such avalanches occur regularly in the Alps, where they are known as *grundlawinen*. Another type (*staublawnen*) occurring in the winter season is characterized by the dry and finely divided condition of the snow, and results from the overloading of the snow-fields. A third class is the ice-avalanche, occurring along the course of glaciers. Avalanches are often very destructive, sweeping away trees, houses and everything in their path. Their destructive effects are greatly increased by the wind-blasts which accompany them. Those occurring in winter usually cause the greatest loss of life, as they develop suddenly and without warning; those that take place in spring generally follow a definite path and are more or less regular in their occurrence. The planting of forests on the high slopes sometimes affords protection from avalanches, but when this is not feasible, stone structures are employed.

Aval Islands. See **BAHREIN**.

Av'alón, Cal., a summer resort on Santa-Catalina Island, established for the purpose of supplying the comforts of life at a minimum cost. It is owned by a joint stock company, and was literally built to order when it was determined to build the town. The sight selected was a desert, with not a tree in sight and only a few shanties of fishermen along shore. Water was found in a neighboring cañon to the north and piped over the hills. The ground was leveled, the hollows filled, and small prominences cut down. The surveyor platted the tract, laid out streets, avenues, walks, and a central plaza or park with provision for fountains. This accomplished, the plumbers followed, and a system of sewerage and water pipes was introduced. The aid of the forester

was next called into play, and the streets and avenues were planted with small Australian eucalyptus trees. A wharf was built, a hotel or restaurant, several cottages for the superintendent, a number of tents erected, and what is known as the "tent city" was finished. The tent city is a feature peculiar all along the southern California coast, for the benefit of ranchers and others from the inland cities and towns who desire to escape the heat and enjoy life at the seashore at a minimum cost.

What is known as the "tent city" is more or less peculiar to California, and the local papers, from the heart of the Sierras to the sands of the ocean, during the summer months, all contain glowing advertisements of the "tent city." Such cities, with a population of several hundred, are found at many points on the Pacific coast. The equipment of the "tent city" constitutes a business in itself. At Avalon is a large circus tent which in winter contains furniture of every description. Here, in fact, the "tent city" was in winter quarters, everything being classified and arranged with order and system. In April or May a gang of workmen descends upon the winter quarters, and like magic the vacant lots are filled, and in a day a city is reared as though by the touching of the proverbial button. Each tent is neatly and well furnished, and can be rented for a nominal cost, the owners of the island giving the ground rent and free water, each lot being sewered and perfect in its sanitary arrangement. The visitor can rent a tent for sleeping, a parlor and kitchen, or he can rent a single room. In the centre of the "tent city" is a store where every description of food, carefully prepared and cooked, can be obtained. Near by the Y. M. C. A. has opened a reading room and library.

The questions of the physical and moral welfare of such a community would seem an important and difficult one to manage, but all this and even the amusements are included in the plan, and we have a city where every door is open and where probably the jail is used hardly once in the season. On the borders of the city is a large amusement hall, and in the neighboring grove is a band stand where the finest band in southern California gives an open-air concert from 7 until 9, seats being provided for 1,200 people. No smoking is allowed within the area of the seats. At the end of the concert the band adjourns to the "pavilion," and a ball is given free to the inhabitants of the "tent city" and others. No policeman is in evidence in the town, though guardians of the peace are present in citizen's clothes. In fact, here is a summer municipality of large size, conducted by a corporation that attends to everything; keeps the town clean, provides amusement, sustains a health officer, administers justice through a justice of the peace, provides the government with a post-office, and maintains two daily boats between the island and the mainland—an experiment in government worthy the attention of the pessimist who affects to believe that communities cannot be run by machinery, as this virtually is, so well arranged and systematized are the methods. It might be assumed that a series of stringent and excessive taxes would be imposed upon each resident, but investigation shows that each resident of the tent city of Avalon pays but \$2.75 per capita per season for the privileges, which is the

AVALON — AVELLANEDA

cost of round trip fare from Los Angeles to the island, a distance of 50 miles, more or less. This and the rent of tent constitute the sole tax. The winter population is generally less than 1,000, but in summer 75,000 persons are to be found at times living within the corporate limits.

Av'alon, the legendary elysium of King Arthur, being his abode after disappearing from the haunts of men; called also *Avilion*. The name is also identified with Glastonbury, and has been given to a peninsula of Newfoundland.

Avalos, á'vā-lōs', the name of a noble Neapolitan family, which included Ferdinand D' Avalos, Marquis de Pescara: b. Naples, 1490; d. 1525. He served with distinction in the army of Charles V., and was taken prisoner by the French at the battle of Ravenna in 1512. He beguiled the hours of captivity by writing a 'Dialogue of Love,' which he dedicated to his wife, the beautiful and accomplished Vittoria Colonna. He soon recovered his liberty, and subsequently displayed extraordinary ability in the wars of Charles V.

Avare, L', la-vār' (The Miser), the title of one of the most famous of Molière's prose comedies, first produced 9 Sept. 1668. It is founded on the 'Aulularia' of Plautus, and was paraphrased by Fielding in his comedy of 'The Miser.' Harpagon is a sexagenarian miser who incarnates the spirit of avarice and has determined to marry a young woman named Mariane, but ultimately prefers his gold to matrimony.

Ava'ris, a city of ancient Egypt, by some writers identified with Tanis, the modern Sān, and once the capital of the Shepherd Kings.

Avars, ä'vārz, or **Avares**, a nation of Mongolian or Turkish origin, who at an early period migrated to the regions around the Don, the Caspian Sea, and the Volga. They served in Justinian's army, and later made themselves masters of Dalmatia, pressed into Thuringia and Italy, where they fought with the Franks and Lombards, and extended their dominion over the Slavonians dwelling on the Danube and farther north, as well as over the Bulgarians on the Black Sea. They were at length overcome by Charlemagne, and after 827 disappear from history; but the valley of Erlav, a small tributary of the Danube in Lower Austria, was called, the "land of the Avars" as late as the 10th century.

The name is also borne by a tribe estimated to number upward of 100,000, now living in the Caucasus Mountains, noted for their struggle with Russia, in which they were led by Schamyl (q.v.). See also LESGHIAN.

Avatar, äv'a-tār', in Hindu mythology, an incarnation of the Deity. Ten avatars are peculiarly distinguished, and four of them are the subjects of *Purānas*, or sacred poems. These 10 are among the incarnations of Vishnu, the supreme God. The Matsya avatar was the descent of the Deity in the form of a fish; Kachyapa or Kūrma, in that of a tortoise; Varāha, as a boar; Nara-sinha, as a monster, half man, half lion; Vāmana, as a dwarf; Parasurama, as the son of Jamadagni. All these took place in the *Satya Yuga*, or golden age. The seventh

incarnation was in the form of the four sons of King Dasaratha, under the names of Rāma, Lakshmana, Bharata, and Satrugna, in order to destroy certain demons that infested the earth. The achievements of Rāma form the subject of the celebrated epic called the *Rāmāyana*. The eighth avatar of Vishnu, in the form of Krishna, is the best known of all, from the fact that it forms the subject of the great Sanskrit epic poem, the *Mahābhārata*. Its object was to relieve the earth from the Daityas, and the wicked men who oppressed it. The ninth was in the form of Buddha. The Kalki, or tenth avatar, is yet to come at the end of the *Kali Yuga*, or the iron age. See VISHNU.

Avatcha, a-vā'cha, a volcano and bay in Kamchatka. The volcano, 9,000 feet high, was last active in 1855. The town of Petropavlovsk is situated on the bay.

Ave Maria, a'vā mā-rē'a (Latin; hail Mary, from *avere*); among the Roman Catholics the beginning of a prayer to the Virgin, whence the whole prayer is called *Ave Maria*. It is the beginning of the salutation which the angel addressed to the Virgin, as he announced to her that she should be the mother of the Saviour (Luke i. 28; "Hail, highly favored, the Lord is with thee; blessed art thou among women"). See ROSARY.

Avebury, ä'ber-ī, Lord. See LUBBOCH, SIR JOHN.

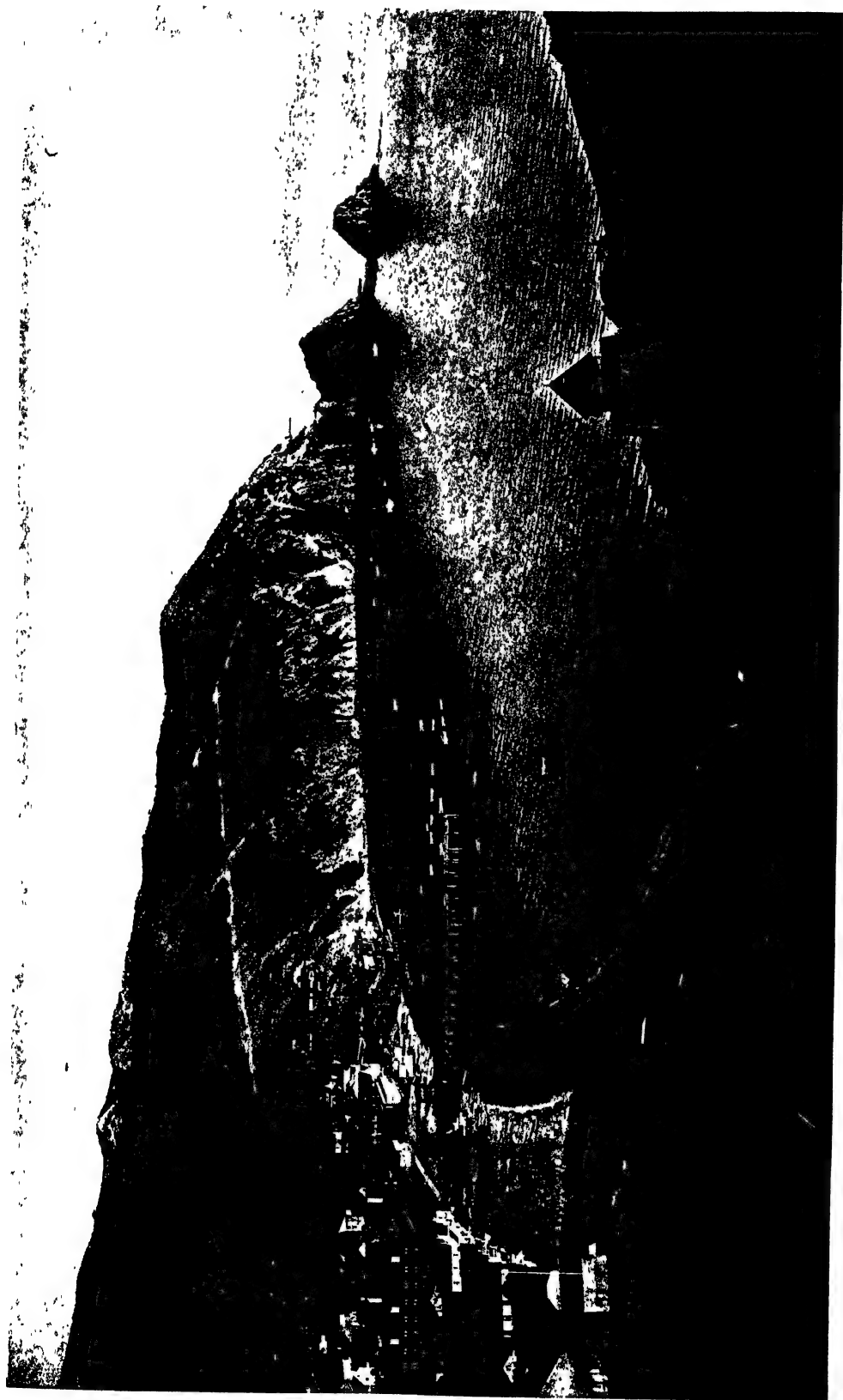
Ave'bury, England, a village in Wiltshire, occupying the site of a so-called Druidical temple, which originally consisted of a large outer circle of 100 stones, from 15 to 17 feet high, and about 40 feet in circumference, surrounded by a broad ditch and lofty rampart, and enclosing two smaller circles. On the neighboring downs are numerous barrows or tumuli, one of which, called Silbury Hill, rises to the height of 130 feet, with a circumference of 2,027 feet at the base, covering an area of more than five acres.

Aveiro, a-vā'e-rō, a seaport town in Portugal, 35 miles south of Oporto. It is a bishop's see, and contains a cathedral. Aveiro has manufactures of earthenware, and salt is made in great quantities from the lagoons in the neighborhood. A thriving trade is carried on in oil, wine, and oranges. Pop. (1890) 10,000.

Avellaneda, a-vā'lya-nā'da, **Alfonso Fernandes de**, the pseudonym of the writer of a sequel to 'Don Quixote,' issued prior to the sequel by Cervantes. See DON QUIXOTE.

Avel'lane'da, Nicholas, Argentine statesman: b. Tucuman, 1 Oct. 1836; d. 26 Dec. 1885. He was professor of political economy in the University of Buenos Ayres; minister of public instruction in 1868-74, and president of the republic in 1874-1886. He published several historical and economical works.

Avellaneda y Arteaga, a-vā'lya-nā'da ē ār'tā-ā'ga, **Gertrudis Gomez de**, distinguished Spanish poet, dramatist and novelist: b. Puerto Principe, Cuba, 23 March 1814; d. Madrid, 2 Feb. 1873. Under the pseudonym Peregrina she contributed to Andalusian journals many 'Lyric Poems' (1851-54), and afterward wrote a series of spirited novels: 'Two Women,' 'The Baroness de Joux,' 'Dolores,' and others. She gained still higher distinction with the tragedies 'Alfonso Munio,' the hero



THE CURVING BEACH AT AVALON, SANTA CATALINA, CALIFORNIA.

AVELLINO—AVERNUS

of which was her own ancestor, and 'The Prince of Vianna.' Her later compositions had a tone of melancholy; among these are Biblical dramas, as 'Saul' and 'Balthasar'; the spiritual song, 'At the Cross,' and 'The Last Ascent of My Harp' (1850). In the later years of her life she composed 16 plays which still have a place on the Spanish stage.

Avellino, à'vèl-lè'nō, a town in Italy, 29 miles east of Naples. It has a square adorned with an obelisk, and possesses several agreeable promenades. Pop. (1901) 23,700

Ave'na. See OAT.

Avenarius, Richard, German philosopher: b. Paris 1843; d. Zurich 1896. He studied philosophy at the universities of Zurich, Berlin, and Leipzig, and from 1877 to his death was professor of philosophy at Zurich. He wrote on Spinoza's pantheism, published a theory of experience and contributed many papers to magazines and reviews, upon philosophical subjects.

Avenches, à-vànsh', Switzerland, a town in the canton of Vaud, seven miles northwest of Fribourg. It is the ancient Aventicum, capital of Helvetia under Roman rule, and is noted for its Roman relics, notably the ruins of an amphitheatre, and a Corinthian column belonging to a temple of Apollo. In Roman times it was a city of 20,000 inhabitants. The population now is about 2,000.

Av'ene!, Mary, a character appearing in Scott's novels, 'The Monastery' and 'The Abbot.'

Avenel, àv-nèl', **Paul**, a French poet and novelist: b. Chaumont 9 Oct. 1823. He was active in connection with several periodicals, and besides several vaudevilles, he wrote 'The Peasant Woman from the Abruzzi' (1861), a drama; 'The King of Paris' (1860), a historical romance; 'The Calicoes' (1866), scenes of real life. Among several collections of poems may be mentioned 'Alcove and Boudoir,' interdicted in 1855 and re-published in 1885.

Aven'ger of Blood, among primitive peoples the next of kin to a murdered man, upon whom was laid the duty of avenging the crime by killing the murderer. In this custom may be detected the source of the system of criminal law.

Av'entine, the southernmost of the seven hills of Rome, on the left bank of the Tiber, between the river and the Cælian hill. The Circus Maximus lay to the northeast of the Aventine, between it and the Palatine, and the baths of Caracalla were on the southeast.

Aven'turine. See QUARTZ; SUNSTONE.

Avenzoar, à'vèn-zō'ar, or more correctly, **Abu-Merwan-Mohammed - ben - Abdalmalec - ben-Zohar**, Arabian physician of the 12th century: b. Seville, Spain; d. Morocco, 1169. He became eminent in his profession, traveled much, and passed through many adventures, among which was a long imprisonment at Seville. He had the care of a hospital, and composed a work entitled 'Al Theiser,' containing a compendium of medical practice, and including many facts and observations not found in the preceding writers, which was probably the result of his own experience. The report of his having lived to the age of 135 is probably an error arising from his having been con-

founded with his son, of the same name and profession, who lived at Morocco, and was the author of a treatise on the regimen of health.

Av'rage, in maritime law, is general, particular or petty. General average (also called gross) consists of expense purposely incurred, sacrifice made, or damage sustained for the common safety of the vessel, freight and cargo, or the two of them, at risk, and is to be contributed for by the several interests in the proportion of their respective values exposed to the common danger, and ultimately surviving, including the amount of expense, sacrifice or damage so incurred in the contributory value. Indemnity for general average loss is ordinarily stipulated for in policies against the risks in navigation, subject, however, to divers modifications and conditions. Under maritime policies in the usual form, insurers are liable for the contributions, for loss by jettison of cargo, sacrifice of cables, anchors, sails, boats, delay for the purpose of refitting, voluntary stranding, etc. Average particular (also called partial loss) is a loss on the ship, cargo or freight, to be borne by the owner of the subject on which it happens, and is so called in distinction from general average, and, if not total, it is also called a partial loss. It is insured against in marine policies in the usual forms on ship, cargo or freight, when the action of peril is extraordinary, and the damage is not mere wear or tear, and on the ship covers loss by sails split or blown away, masts sprung, machinery of steamship disabled, planks started, change of shape by strain, loss of boat, breaking of sheathing or upper works or timbers, damage by collision or stranding, by lightning or fire, or in defense against pirates or enemies, or by hostile or piratical plunder. Petty average consists of small charges formerly assessed upon the cargo, to wit: anchorage, pilotage, beaconage, towage, quarantine, etc.

Av'rage Man, An, a society novel by Robert Grant. It is a story of manners rather than plot, concerning itself more with types than with individuals.

A'verell, William Woods, American military officer: b. Cameron, N. Y., 5 Nov. 1832; d. Bath, N. Y., 3 Feb. 1900. He was educated at West Point, and served on the frontier, and in several Indian campaigns till the beginning of the Civil War, when he was appointed colonel of the Third Pennsylvania Cavalry, and assigned to the command of the cavalry defenses of Washington. During the war he distinguished himself on numerous occasions as a cavalry raider and commander, and at its close was brevetted major-general of volunteers. He resigned from the regular army while holding the rank of captain, in 1865, and, under an act of Congress, was reappointed captain in August 1888, and was placed on the retired list in the same month. He was United States Consul-General at Montreal in 1866-9. He invented a system of asphalt pavement now quite generally adopted and the Averell insulating conduits for wires and conductors.

Avernus, a-vèr'nūs, a small circular lake, now called *Lago d'Averno*, in Naples, kingdom of Italy, between the ancient Cumæ and Puteoli. It is surrounded by hills of a moderate height, which used to be covered with immense woods,

AVERROES—AVESTA

while the atmosphere was charged with unhealthy mephitic effluvia, and occupies the crater of an extinct volcano. By ancient Greek writers, subsequent to Homer, it was fabled to be the entrance to the infernal regions, and to have been the place where Ulysses entered in his visit to the shades. It was also thought that the Cimmerians of Homer dwelt on the banks of this lake. The sibyl of Cumæ is said to have had her grotto here, and Virgil represents her as guiding Æneas when he made his descent ("*facilis descensus Averno*") to the infernal regions at this place.

Averroes, av-er-rōs' (corrupted from *Ebn* or *Ibn Roshd*), a renowned Arabian philosopher: b. Cordova, Spain, 1126; d. about 1198. He became a *cadi* or judge first in Seville and afterward in Cordova. He was accused of rejecting the established religion, and in consequence deprived of his offices, and fled to Fez. Here he was condemned by a spiritual court to recant and undergo a public penance. Upon this he went back to his own country, but was latterly restored to his dignities in Morocco. Averroes regarded Aristotle as the greatest of all philosophers, and explained his writings, with only a slight deviation from his views. Besides commentaries on Aristotle and other philosophical works he wrote also a compendium of physic, called '*Colliget*' (a corruption of the Arabic '*Kulliyat*,' or summary), and treatises on jurisprudence, astronomy, grammar, etc. His commentaries upon Aristotle, in a Latin translation, were repeatedly printed at Venice in the 15th and 16th centuries. His '*Colliget*' also was early translated into Latin, and several times printed. See Renan, '*Averroes et l'Averroïsme*' (1860); Muller, '*Philosophie und Theologie von Averroes*' (1875).

Aversa, a-vēr'sa, a town of Italy, nine miles north of Naples, on a plain covered with vines and orange trees. It is the seat of a bishop, and is famed for a kind of almond-cake, called *torrone*, in great demand at Naples. Pop. (1901) 23,477.

A'very, Benjamin Parke, American journalist and diplomatist: b. New York 1829; d. Peking, China, 8 Nov. 1875. He went to California in 1849 and became connected with several papers on the Pacific coast, among them the *San Francisco Bulletin*. In 1872 he was appointed editor of the '*Overland Monthly*.' From 1874 to 1875 he was United States minister to China. His chief work is '*Californian Pictures in Prose and Verse*' (1877).

A'very, Elroy McKendree, American writer: b. Erie, Mich., 1844. He served in the Federal army during the Civil War, and has since been prominent in educational matters. Among his many published works are textbooks in physics and chemistry, '*Words Correctly Spoken*' (1887); and '*A Popular History of the United States*,' now in progress of publication.

Avery, Otis, American dentist: b. Bridgewater, Oneida County, N. Y., 19 Aug. 1808; d. Honesdale, Pa., 1904. He then took up the study of dentistry, and began the practice of his profession at Honesdale, Pa., where he lived for the greater part of his life. For some years he was the only dentist between Honesdale and Utica, N. Y., and at the time of his death was the oldest practising dentist in the United States.

A'very, Samuel Putnam, American merchant: b. New York, 17 March 1822. He became a copper-plate and wood engraver, and subsequently an art publisher and dealer, and retired from business in 1888. He was a founder of the Metropolitan Museum of Art; life member of the American Museum of Natural History, American Geographical Society, American Historical Society, American Zoological Society; president of the Grolier Club, and first president of the Sculpture Society. In 1891, with his wife, he created and endowed the Avery Architectural Library, in Columbia University, as a memorial of his deceased son; and in May 1900 presented to the trustees of the New York Public Library a collection of etchings, lithographs, and photographs, numbering more than 17,500 pieces, together with a number of large volumes illustrated by the same arts.

A'very, Waitstill, American lawyer. b. Norwich, Ct.; d. North Carolina, 1821. He practised his profession successfully; was appointed in 1777 attorney-general of North Carolina, and was at the time of his death the patriarch of the bar of that State. He was prominent in the political affairs of the State, being a member of the State congress prior to the Revolution, and of the State legislature after the establishment of peace. In 1777 he was appointed one of a commission to treat with the Cherokee Indians.

A'very's Gores, the name of several tracts of land in Vermont, granted to Samuel Avery in 1791. One of them is in Addison County, nearly on the summit of the Green Mountains, now forming a part of Granville.

Aves, a'vās, or **Bird Islands**, a group of small islands belonging to Venezuela, valuable for their deposits of guano.

Aves, ā'vēz, the class of vertebrated animals which contains the birds. They have been defined by Dr. Gadow as "oviparous, warm-blooded, amniotic vertebrates, which have their anterior extremities transformed into wings." The metacarpus and fingers carry feathers or quills; there is an intertarsal joint, and the feet have not more than four toes, of which the first is the hallux. See **BIRDS**.

Aves'ta, or **Zend-Avesta**, the Bible of Zoroaster, the sacred book of ancient Iran, and holy scripture of the modern Parsis. The exact meaning of the name "*Avesta*" is not certain; it may perhaps signify "law," "text," or, more doubtfully, "wisdom," "revelation." The modern familiar designation of the book as *Zend-Avesta* is not strictly accurate; if used at all, it should rather be *Avesta-Zend*, like "*Bible and Commentary*," as *sand* signifies "explanation," "commentary," and *Avesta u Zand* is employed in some Persian allusions to the Zoroastrian scriptures as a designation denoting the text of the *Avesta* accompanied by the Pahlavi version or interpretation. The story of the recovery of the *Avesta*, or rather the discovery of the *Avesta*, by the enthusiastic young French scholar, Anquetil du Perron, who was the first to open to the western world the ancient records of Zoroastrianism, reads almost like a romance. Du Perron's own account of his departure for India in 1754, of his experiences with the *dasturs* (or priests) during a seven years' residence among them, of his various

AVESTA

difficulties and annoyances, setbacks, and successes, is entertainingly presented in the introductory volume of his work 'Zend-Avesta, *Ouvrage de Zoroastre*' (1771). This was the first translation of the ancient Persian books published in a European language. Its appearance formed one of those epochs which are marked by an addition to the literary, religious, or philosophical wealth of our time; a new contribution was added to the riches of the West from the treasures of the East. The field thus thrown open, although worked imperfectly at first, has yielded abundant harvests to the hands of later gleaners. With the growth of knowledge of the language of the sacred texts, we have now a clear idea also of the history of Zoroastrian literature, and of the changes and chances through which with varying fortunes the scriptures have passed. The original Zoroastrian Avesta, according to tradition, was in itself a literature of vast dimensions. Pliny, in his 'Natural History,' speaks of two million verses of Zoroaster; to which may be added the Persian assertion that the original copy of the scriptures was written upon twelve thousand parchments, with gold illuminated letters, and was deposited in the library at Persepolis. But what was the fate of this archetype? Parsi tradition has an answer. Alexander the Great,—“the accursed Iskander,” as he is called,—is responsible for its destruction. At the request of the beautiful Thais, as the story goes, he allowed the palace of Persepolis to be burned, and the precious treasure perished in the flames. Whatever view we may take of the different sides of this story, one thing cannot be denied: the invasion of Alexander and the subjugation of Iran was indirectly or directly the cause of a certain religious decadence which followed upon the disruption of the Persian empire, and was answerable for the fact that a great part of the scriptures was forgotten or fell into disuse. Persian tradition lays at the doors of the Greeks the loss of another copy of the original ancient texts, but does not explain in what manner this happened; nor has it any account to give of copies of the prophet's works which Semitic writers say were translated into nearly a dozen different languages. One of these versions was perhaps Greek, for it is generally acknowledged that in the 4th century B.C. the philosopher Theopompus spent much time in giving in his own tongue the contents of the sacred Magian books.

Tradition is unanimous on one point at least: it is that the original Avesta comprised 21 *Nasks*, or books, a statement which there is no good reason to doubt. The same tradition which was acquainted with the general character of those *Nasks* professes also to tell exactly how many of them survived the inroad of Alexander; for although the sacred text itself was destroyed, its contents were lost only in part, the priests preserving large portions of the precious scriptures. These met with many vicissitudes in the five centuries that intervened between the conquest of Alexander and the great restoration of Zoroastrianism in the 3d century of our era, under the Sassanian dynasty. At this period all obtainable Zoroastrian scriptures were collected, the compilation was codified, and a detailed notice made of the contents of each of the original *Nasks* compared with the portions then surviving. The

original Avesta was, it would appear, a sort of encyclopædic work; not of religion alone, but of useful knowledge relating to law, to the arts, science, the professions, and to every-day life. If we may judge from the existing table of contents of these *Nasks*, the zealous Sassanians, even in the time of the collecting (226–380 A.D.), were able to restore but a fragment of the archetype, perhaps a fourth part of the original Avesta. Nor was this remnant destined to escape misfortune. The Mohammedan invasion, in the 7th century of our era, added a final and crushing blow. Much of the religion that might otherwise have been handed down to us, despite “the accursed Iskander's” conquest, now perished through the sword and the Koran. Its loss, we must remember, is in part compensated by the Pahlavi religious literature of Sassanian days.

Fragmentary and disjointed as are the remnants of the Avesta, we are fortunate in possessing even this moiety of the Bible of Zoroaster, whose compass is about one tenth that of our own sacred book. A grouping of the existing texts is here presented: (1) *Yasna* (including *Gathas*); (2) *Visperad*; (3) *Yashts*; (4) *Minor Texts*; (5) *Vendidad*; (6) *Fragment*s.

Even these texts no single manuscript in our time contains complete. The present collection is made by combining various Avestan codexes. In spite of the great antiquity of the literature, all the existing manuscripts are comparatively young. None is older than the 13th century of our own era, while the direct history of only one or two can be followed back to about the 10th century. This mere external circumstance has of course no bearing on the actual early age of the Zoroastrian scriptures. It must be kept in mind that Zoroaster lived at least six centuries before the birth of Christ.

Among the six divisions of our present Avesta, the *Yasna*, *Visperad*, and *Vendidad* are closely connected. They are employed in the daily ritual, and they are also accompanied by a version or interpretation in the Pahlavi language, which serves at the same time as a sort of commentary. The three divisions are often found combined into a sort of prayer-book, called *Vendidad-Sadah* (*Vendidad Pure*); that is, Avesta text without the Pahlavi rendering. The chapters in this case are arranged with special reference to liturgical usage.

Some idea of the character of the Avesta as it now exists may be derived from the following sketch of its contents and from the illustrative selections presented:

1. *Yasna* (sacrifice, worship), the chief liturgical work of the sacred canon. It consists mainly of ascriptions of praise and of prayer, and corresponds nearly to our idea of a prayer-book. The *Yasna* comprises 72 chapters; these fall into three nearly equal parts.

The greater part of the *Yasna* book is of a liturgic or ritualistic nature, and need not here be further described. Special mention, however, must be made of the middle section made up by “the Five *Gathas*” (hymns, psalms), a division containing the 17 sacred psalms, sayings, sermons, or teachings of Zoroaster himself. These *Gathas* form the oldest part of the entire canon of the Avesta. In them the prophet of the new faith is speaking with the fervor of the Psalmist of the Bible. In them we feel

AVEYRON—AVIGNON

the thrill of ardor that characterizes a new and struggling religious band; we are warned by the burning zeal of the preacher of a Church militant. Now, however, comes a cry of despondency, a moment of faint-heartedness at the present triumph of evil, at the success of the wicked and the misery of the righteous; but this gives way to a clarion burst of hopefulness, the trumpet note of a prophet filled with the promise of ultimate victory, the triumph of good over evil. The end of the world cannot be far away; the final overthrow of Ahriman (Anra Mainyu) by Ormazd (Ahura Mazda) is assured; the establishment of a new order of things is certain; at the founding of this "kingdom" the resurrection of the dead will take place and the life eternal will be entered upon.

The *Visperad* (all the masters) is a short collection of prosaic invocations and laudations of sacred things. Its 24 sections form a supplement to the Yasna. Whatever interest this diversion of the Avesta possesses lies entirely on the side of the ritual, and not in the field of literature. In this respect it differs widely from the book of the Yashts, which is next to be mentioned.

Yashts (praises of worship) form a poetical book of 21 hymns, in which the angels of the religion, "the worshipful ones" (*Yasatas*, *Icads*), are glorified, and the heroes of former days. Much of the material of the Yashts is evidently drawn from pre-Zoroastrian sagas which have been remodeled and adopted, worked over, and modified, and incorporated into the canon of the new-founded religion. There is a mythological and legendary atmosphere about the Yashts, and Firdausi's 'Shah Nameh' serves to throw light on many of the events portrayed in them, or allusions that would otherwise be obscure. All the longer Yashts are in verse, and some of them have poetic merit. There are several translations of the Avesta. The best (except for the Gathas, where the translation is weak) is the French version by Darmesteter, 'Le Zend Avesta,' published in the 'Annales du Musée Guimet'. An English rendering by Darmesteter and Mills is contained in the 'Sacred Books of the East,' Vols. IV, XXIII., XXXI.

Aveyron, a'vā-rōn', a department in the south of France. It is extremely mountainous, and is traversed by five considerable rivers, the Aveyron, after which the department is named, the Viaur, the Truyère, the Lot, and the Tarn. Of these, the only one navigable within the department is the Lot. It is only in the west that plains of any considerable extent are found. Agriculture is in a very defective state, but considerable attention is paid to sheep-breeding. Cheese of an excellent quality is made and exported in large quantities. Aveyron possesses valuable coal, iron, and copper mines, besides other minerals. Pop. (1901) 377,559.

Aviary, a house or enclosure, larger than an ordinary cage, for living birds. Out-of-door aviaries are common in the warm countries of southeastern Europe and in Asia, and are also quite numerous in England. The freedom of motion possible for a bird in a good-sized aviary helps to keep them in good condition, and many species which are unable to bear the close confinement of a cage flourish in the larger en-

closures. In a climate like that of the United States, where the extremes of temperature are great, outdoor aviaries are uncommon except in zoological gardens. In the New York Zoological Park is an aviary built in 1900, measuring 153 feet long, 72 feet wide, and 55 feet high; at present this is the largest in the world. It is a wire cage, in the shape of a pointed arch, supported by steel frames. It stands among trees, and several are enclosed by it. Game birds, herons, and other large species live in this aviary, and many smaller species, which would suffer out of doors in winter, dwell there during the summer months. See **CAGE-BIRDS**.

Avicebron, a-ve'thā-brōn', **Solomon ben Jehuda ibn Gabriol**, Hebrew poet and philosopher. b. Cordova, about 1028; d. about 1058. Of his poetical works, 'The Royal Crown' is the most famous; of the philosophical, 'The Fountain of Life,' written in Arabic, but known only through a Latin translation (re-edited in Munster, in 1895).

Avicenna, Arabian philosopher and physician: b. near Bokhara, 980 A.D.; d. 1037. He completed his studies at the early age of 18, and began to practise as a physician. He settled subsequently at Hamadan, at first as physician to a noble lady, afterward as vizier of the emir. On the death of his patron his son and successor refused to recognize him as vizier, and accordingly he lived in retirement at Hamadan. Going in later life to Ispahan, he passed in quietness the last 14 years of his life, and composed the greater part of his works on medicine, logic, metaphysics, astronomy, and geometry. Avicenna left many writings, mostly commentaries on Aristotle. Of his medical works, the principal is called 'Canon of Medicine,' founded on the Greek writers, and in some parts of the East is still an authority. It has been printed in the original Arabic, and there have been many Latin translations of it. His other works have also appeared in translations.

Avicennia, or **White Mangrove**, a genus of *Verbenacea*, consists of trees or large shrubs resembling mangroves, and, like them, growing in tidal estuaries and salt marshes. Their creeping roots, often standing six feet above the mud in crowded pyramidal masses, and the naked asparagus-like suckers which they throw up, have a singular appearance. The bark of *A. tomentosa*, the white mangrove of Brazil, is much used for tanning. A green, resinous substance exuding from *A. resinifera* is eaten by the New Zealanders. The genus is named in memory of the Arabian physician, Avicenna (q.v.).

Avienus, **Rufus Festus**, Latin descriptive poet, who flourished about the end of the 4th century after Christ, and wrote 'Descriptio Orbis Terræ,' a general description of the earth; 'Ora Maritima,' an account of the Mediterranean coasts, etc.

Avignon, a've-nyōn' (ancient *Avenio*), a French city, capital of the department Vaucluse, on the left bank of the Rhone. It consists generally of large antique houses, in narrow, crooked, dirty streets. The principal objects of interest are the large and very ancient cathedral; the papal palace, with lofty massive walls and strong towers, and the chamber of the Inquisition. The silk manufacture is the

AVILA—AVON

principal source of employment at Avignon, and the rearing of silkworms is carried on extensively in the district. The city has also manufactories of velvet, woolen, and other goods, hats, jewelry, etc., with silk dye-works, paper-mills, tanneries, etc., and a trade in wine, brandy, iron, cotton, wool, grain, and other articles, of which it is the entrepôt for Lower Dauphiné, Provence, and all Languedoc. Here Petrarch lived several years; here he saw his Laura, who formed the subject of his most beautiful verses, and whose tomb is still to be found in the Franciscan Church. The fountain of Vaucluse is five leagues from Avignon. It belonged to the papal see from 1348 to 1791, and from March 1309 to September 1376 seven Popes in succession, from Clemens V to Gregory XI., were compelled to reside in this city. The Catholic historians commonly call this period the Babylonish captivity of the Popes. Near Avignon are found many Roman antiquities. Pop. (1896) 45,107.

Avila, a've-la, **Gil Gonzalez d'**, Spanish antiquary and biographer: b. 1577; d. 1658. He was made historiographer of Castile in 1612, and of the Indies in 1641. Most valuable works: 'Teatro de las Grandezas de Madrid' (1623); and 'Teatro Ecclesiastico' (1645-53).

Avila, Juan de, celebrated Spanish preacher, commonly called the "Apostle of Andalusia"; b. Almodavar del Campo, 1500; d. 1569. His missionary labors in Andalusia were prosecuted with untiring zeal and singular success, until he arrived at the age of 50, when, with a worn-out constitution, he was obliged to desist. His 'Spiritual Letters' have been translated into most European languages.

Avila y Zuniga, a've-lā e thoo'nye-ga, **Don Luis d'**, Spanish general, diplomatist, and historian; a favorite of Charles V.: b. about 1490; d. after 1552. His chief work, translated into five or six languages, was on the war of Charles V. in Germany.

Avila, a town of Spain, the capital of the province of Avila, a modern division of Old Castile. It is the see of the bishop suffragan of Santiago, with a fine cathedral, and was once one of the richest towns of Spain. Principal employment in the town is spinning; in the province, breeding sheep and cattle. Pop. (1897) 11,700.

Aviles, a've-lās', a town of northern Spain, 19 miles from Oviedo. It has a good harbor and a considerable trade in copper and wine. Pop. (1897) 12,100.

Avison, Oliver R., English physician: b. Yorkshire, 30 June 1860. He removed to Canada in youth, and became professor of materia medica, instructor of microscopy and demonstrator of materia medica in the University of Toronto. In 1893 he went to Korea as a medical missionary; the same year he was appointed to the charge of the Royal Korean Hospital, and in the following year became physician to the royal family.

Avitus, Marcus Mæcilius, an emperor of the West. He belonged to a Gaulish family in Auvergne, and gained the favor of Constantius, the colleague of Honorius, and of Theodoric, king of the Visigoths. He served with distinction under Ætius, became Prefect of Gaul, and concluded a favorable treaty with the Goths.

He afterward retired into private life until the invasion of Attila, when he induced the Goths to join the Romans against the common enemy. Avitus was proclaimed emperor in 455, took for his colleague Marcianus, and died the year following.

Aviz, a vesh, **Order of**, a Portuguese order of knighthood, created in 1147 by Alphonso I. The knights were then called Knights of Evora, but took their present title, in 1287, from their gallant defense of the fortress of Aviz against the Moors. The order was changed from an ecclesiastical to a civil institution in 1789. The king of Portugal is the grand master of the order.

Avlona, av-lō'na, a seaport in Albania, protected by the island of Sasseno, the ancient Saso. It is one of the stations of the Austrian Lloyd steamers, and carries on considerable trade with Brindisi, etc. The Christian inhabitants, chiefly Italians, are engaged in commerce, exporting oil, wool, salt, pitch, and especially some 40,000 tortoise shells yearly. The Turks are employed in the manufacture of weapons and woolen fabrics. Valonia, a material imported to England for tanning, is the pericarp of an acorn grown in the neighborhood. Up to 1691 the town belonged to the Venetians. Pop. about 6,000.

Avoca, or **Ovoca**, a beautiful valley and river of Ireland, near Glendalough, in the county of Wicklow, and celebrated as being the scene which gave rise to one of the finest of Moore's 'Irish Melodies'. Avoca is also the name of a village in the town of Bath, Steuben County, N. Y.

Avocado (äv'ō-kā'dō) **Pear**, a tropical fruit. See ALLIGATOR PEAR.

Avocet, a shore-bird of the limicoline genus *Recurvirostra*, remarkable for its very slender beak, which curves upward toward the end like a cobbler's awl. It is a near relative of the stilt sandpiper, and various species occur throughout the world. The North American species, *Recurvirostra americana*, is found in summer throughout the temperate parts of the country, migrating to the tropics in winter. It is about 17 inches in length, brownish-black above and white below, with the head, neck, and chest light cinnamon. Its general habits are those of sandpipers.

Avoga'dro's Law, a rule laid down by Amedeo Avogadro, an Italian physicist: b. Turin 1776; d. 1856. See ATOMIC THEORY.

Avoidupois, äv'er-dū-pois' (French *avoir du poids*, to have weight), a system of weights and measures in which a pound contains 7,000 grains or 16 ounces, while a pound troy contains 1,760 grains or 12 ounces. All larger and coarser commodities are weighed by avoidupois weight. The avoidupois ounce is less than the troy ounce in the proportion of 72 to 79.

Avola, ä'vō-la, a seaport on the east of Sicily, 20 miles southwest of Syracuse, with a trade in almonds, sugar, etc. Pop. (1901) 16,264.

Avon, ä'vön, the name of several rivers in England, the most important of which are the following: (1) The Upper Avon, rising in Leicestershire, runs southwest, and falls into the Severn at Tewkesbury. Stratford-on-Avon,

AVONDALE — AXE

a town on this river, is the birthplace of Shakespeare; (2) the Lower Avon, which rises near Tetbury, in Gloucestershire, and falls into the Severn northwest of Bristol, being navigable as far as Bath; (3) in Monmouthshire; (4) in Wiltshire and Hampshire, enters the English Channel at Christchurch Bay, in the latter county.

Avondale, a parish of Scotland, in the county of Lanark. At the battle of Drumclog, fought near this place 1 June 1679, Grahame of Claverhouse, the famous Viscount Dundee, was defeated by the forces of the Scottish Covenant. A graphic description of this battle is found in Sir Walter Scott's 'Old Mortality.'

Avranches, a-vrānsh' (ancient *Abrincæ*), a town in France, about 3 miles from the Atlantic, and 30 miles east of St. Malo. It is pleasantly situated at the end of a long ride, the summit of which was crowned by a magnificent cathedral; built in the 11th century, and destroyed at the revolution. In this cathedral Henry II. did penance before two of the Pope's legates for the murder of Thomas à Becket. One of its bishops was the celebrated Huet, author of the 'Demonstratio Evangelica.' The manufactures are chiefly lace, white thread, and wax candles, and there is some trade in agricultural produce. Pop. (1896) 7,600.

Avulsion (Latin, *avulsion*, a tearing off), a term denoting the sudden transfer by natural causes of a portion of one man's land to that of another, as when the course of a river is suddenly changed and former boundaries altered. It differs from accretion, which describes a gradual addition to the property of a riparian owner by the action of the water. See ALLUVION.

Awaji, a-wa'jē, one of the islands of Japan, situated between the main island and Sikokee. Its area is 218 square miles. Pop. 170,000.

Award is the judgment or decision of arbitrators or referees, on a matter submitted to them. The award should be consonant with and follow the submission, to be binding. It must be final and certain. It must be possible to be performed, and must not direct anything illegal to be done. At common law an award could be oral or written, but in some of the States an award to be valid must be in writing. The New York Code Civil Procedure provides that an award to be valid must be in writing. See ARBITRATION AND AWARD.

Awata (a-wā'ta) **Ware**, a yellow faience called "egg-ware" by the Japanese, manufactured in the village of Awata, a suburb of Kioto, and largely purchased in the United States.

Awe, â, a narrow Scottish lake in Argyshire, about 28 miles long, and communicating by the Awe with Loch Etive. It is of great depth, has sloping and well-cultivated shores, terminated by ranges of lofty mountains, among which that of Ben Cruachan, rising to a height of 3,670 feet, at its northern extremity, is most conspicuous. A number of islets are scattered over its surface, and on two of them are some beautiful ruins.

Axayacatl, äx'a-yä-kät, or **Axayacatl**, a Mexican fly, the eggs of which, deposited abundantly on rushes and flags, are collected and sold as a species of *caviare*. The use of

these as an article of diet was learned by the Spanish settlers from their predecessors, the native Indian Mexicans, who called the dish *ahuauhti*.

Axayacatl, ä'cha-yä-kä't'l, a Mexican emperor: d. about 1477. He was the father of Montezuma, whom Cortez conquered, and reigned 14 years. He was already famous as a warrior when he became emperor of the Aztecs, and inaugurated his reign by a successful expedition against Tehauntepec, and in 1467, conquered anew the cities of Cotasta and Tochtepec. A little later he repelled the tribes who strove to get possession of the Mexican capital, and maintained a vigorous warfare against his neighbors. The palace of Axayacatl, a gigantic pile of stone buildings, became the barracks of the Spaniards. His treasures were discovered by Cortez, within a concealed door, and the chronicler of the conquest exclaims that "it seemed as if all the riches in the world were in that room." They consisted of gold and silver in bars and in the ore, many jewels of value, and numerous rich and beautiful articles of curious workmanship, as imitations of birds, insects, or flowers.

Axe (apparently an original Aryan word), a long-handled tool for wood-cutting. Its essential feature is the helve, though a certain shape is imposed by the nature of its service. The chipped flint of the oldest Stone Age was a tool of all work, to crush, dig, or cut (rather, bruise off), as occasion demanded, and was too heavy and shapeless to be used except by hand. As soon as one was shaped and sharpened to admit of tying a handle to it for a heavier stroke, the axe came into being, and was probably the earliest implement thus differentiated. So natural a device was separately invented by each race early in its history, and made of the material at hand: flint in England and America; whinstone or granite in Ireland, and by the lake dwellers of the Continent; bone by the American Indians and Eskimos; while stone axes are still used by some of the South Sea Islanders. In all these cases and until the use of metal, the handle was secured with a thong, as piercing with an eye was impracticable. The first copper and bronze "celts" were made in the same way. But when casting had become familiar, it was seen that there was no difficulty in casting a hole to thrust the handle in, making a much surer and heavier stroke; and with this "eye" the modern axe appeared. The bronze axe was lightened and better shaped, and in its turn displaced by iron, for which with the progress of invention has been substituted an iron butt-inset with a steel cutting part. The old hand forges have for some generations been replaced by immense establishments with developed machinery. The American process consists of cutting the butt from a piece of white-hot iron, punching the eye, then reheating and shaping it by pressure between concave dies; again heating, cutting in the edge a groove, into which the arched steel edge-piece is set, then welding the two and drawing out the axe to a proper edge by trip-hammers at a white heat. The next process is hammering off the implement by a combination of hand and machine work, and restoring the shape lost in drawing out. It is then ground to symmetry, hung on a revolving table in a furnace, and heated over a small

AXEL — AXOLOTL

coal fire, at a peculiar red heat, determined by the eye; cooled in brine and then in fresh water, and removed to another furnace, where it receives the last temper. It is next polished to a finish that shows every flaw, and enables it to resist rust and enter wood easily; then stamped, the head painted to prevent rust, weighed, labeled, and packed for sale. The leading axe establishment of the world is the Collins Company, of Collinsville, Conn., whose processes are largely special inventions for the company. It manufactures 5,000 axes and other edge tools daily, besides other miscellaneous goods; and consumes annually 3,500 tons of iron and 1,200 of steel, and 10,000 tons of coal. Nearly 700 men are employed; 13 water-wheels and four steam engines supply the motive power.

Ax'el, or **Absalon**, Danish prelate, archbishop of Lund: b near Soroe, Zealand, 1128; d. 1201. His family name was Axel. In 1157 he was chosen bishop of Roskilde or Røthchild. In that age warlike pursuits were not deemed inconsistent with the clerical office, and Absalon was a renowned warrior by sea and land, as well as a zealous ecclesiastic, his avowed principle being that "both swords, the spiritual and the temporal, were intrusted to the clergy." To his exertions as statesman and soldier Waldemar was largely indebted for the independence and consolidation of his kingdom.

Ax'elsen, a powerful Danish family who flourished in the latter half of the 15th century, and the members of which figured in the wars of Christian I. and John IV. of Denmark, and Karl Knutsen and Eric the Pomeranian, kings of Sweden. **PETER AXELSEN** was the head of the family. Of his nine sons, the eldest, **OLAF**, made himself master of Gothland; the second, **IVER**, retained that possession, and became a corsair; the third, **ERIC**, was governor of Stockholm; and the fourth **AAGE**, became a Danish counselor of state.

Axholme, an island in Lincolnshire, England, formed by the rivers Trent, Don, Idle, and Vicardyke. Epworth, the home of the Wesleys, is the principal parish. Its area is 47,000 acres. The soil is exceedingly fertile.

Ax'il, in botany, the angle between the upper side of a leaf and the stem or branch from which it grows. Buds usually grow out from the stem in axils of leaves, and this position is naturally termed axillary. In anatomical terminology, the axilla is the armpit.

Axim, a-shēng', or äx'im, an important station and port on the African Gold Coast, near the mouth of the Ancobrah River. Inland from Axim, in the basin of that river, and in the district between it and the Prah, gold-mining operations have been carried on on a large scale. It was ceded to the English by the Dutch in 1872.

Ax'inite (Greek, "like an axe"), a mineral usually occurring in broad, acute-edged triclinic crystals, suggestive, in shape, of an axe. It has a glassy lustré, brown or yellow in color, and is translucent and strongly pleochroic. It has a hardness of 6.5 to 7, and a specific gravity of about 3.28. Its exact composition is still doubtful, but it may be described as a calcium and aluminum borosilicate, containing also varying amounts of manganese and iron. Its most

important occurrences are in Dauphiné, France, Mount Skopi, Switzerland, in Japan and at Franklin Furnace, N. J.

Axin'oman'cy, a mode of divination much practised by the ancient Greeks, particularly with the view of discovering the perpetrators of great crimes. An axe poised upon a stake was supposed to move so as to indicate the guilty person; or the names of suspected persons being pronounced, the motion of the axe at a particular name was accepted as a sign of guilt. Another method of axinoman'cy was by watching the movements of an agate placed upon a red-hot axe.

Ax'iom (an assumption), a universal proposition, which the understanding must perceive to be true as soon as it perceives the meaning of the words, though it cannot be proved. It is, therefore, called a self-evident truth. In mathematics, axioms are those propositions which are assumed without proof, as being in themselves independent of proof, and which are made the basis of all the subsequent reasoning. Euclid has assumed 15 axioms as the basis of geometry. Among these are "The whole is greater than its part"; "Things that are equal to the same thing are equal to one another"; "Magnitudes which coincide, that is, which exactly fill the same space, are equal to one another in every respect." Bacon calls axiom a general principle, obtained by experiment and observation, from which we may safely proceed to reason in all other instances; and Newton gives the name of axiom to the laws of motion, which, of course, are ascertained by the investigation of nature; he also terms axioms those general experimental truths or facts which form the groundwork of the science of optics.

Ax'is (in crystallography). See **CRYSTAL**.

Ax'is (Latin, of unknown origin), a white-spotted deer (*Axis axis*) of India and the East Indies, known locally among the Hindus as "chitra," among the English as the "hog-deer." It resembles the European fallow deer in size and color, and as it is easily domesticated, is a favorite in European parks. The slender, sharp-pointed horns are not palmated and only a little branched, while the female is hornless. It is timid and usually goes in small herds, in which females largely predominate. It lives in thick jungles near water, and usually feeds in the night. Colored plates, illustrating its varieties, are given in Lydekker's 'Deer of All Lands' (1898).

Ax'minster, a market town in Devonshire, England, 24 miles east of Exeter, on the side of a hill that rises above the River Axe. The only public building worthy of notice is the parish church, a very ancient edifice, containing some interesting antique monuments. Axminster was at one time celebrated for its woolen cloth, and carpet manufactures, and gave name to a special make of carpet having a thick, soft pile. Brushes are now made here, and there are flour and other mills. Pop. (1901) 4,100.

Axolotl, äx'ô-löfl (Mex., "play in the water"), a larval salamander regarded as edible. They are numerous in the lakes about the City of Mexico, are 6 to 10 inches long, and are prepared by either roasting or boiling, and eaten with vinegar or cayenne pepper. The

most extraordinary thing about them, however, is the fact that they are the young of a species of terrestrial salamander (*Amblystoma tigrinum*), well known over all the warmer parts of the United States and Mexico, which in these lakes never transform into adults, but remain permanently in the larval condition, yet become sexually mature when about six months old, so that they are able to breed. This astonishing fact was long unknown. The axolotl has bushy, external gills similar to those which permanently characterize the mud-puppy. It was regarded as a distinct animal, and named *Siredon lichenoides*. The discovery of the truth was made accidentally in Paris in 1865, when some axolotls in an aquarium in the Jardin des Plantes lost their gills and were transformed into perfected amblystomas. A lady, studying in the University of Freiburg, Fräulein Marie von Chauvin, then undertook a series of careful experiments with other captives, and worked out the complete history of metamorphosis, which is dependent (at least in Europe) on a very narrow set of favorable circumstances, but differs in no essential degree from that of other salamanders (q.v.). Why the change never takes place in the Mexican lakes is unexplained. The theories in regard to it, and the detailed history of the observations above mentioned, are given by Gadow in 'Amphibia and Reptiles' (1901), with many references to other books and periodicals.

Axon, that part of the nerve cell that carries the nervous impulses, the axis cylinder process, or the nerve fibre proper. See NERVE CELL; NERVE FIBRE.

Axum, *ax-oom'*, a town in Abyssinia, once the capital of a powerful kingdom, and at one time the great depot of the ivory trade in the Red Sea. The importance of this city and its kings was first made known to us by a stone (*Axumitic marble*) with a Greek inscription, first explained by Salt, who discovered it, and afterward by Buttmann and Niebuhr. The interest in this inscription was increased by the explanation which it afforded of the second half of the Adulian marble. Axum, the place where it was found, still exhibits many remains of its former greatness. Among its ruins are shown the royal throne, and groups of obelisks, originally 55 in number, one of which Salt declared to be the most beautiful that he had seen. Pop. 5,000. See Bent, 'The Sacred City of the Ethiopians' (1893).

Ayacuchco, *ä'ya-koo'chō*, the name of a department of Peru and also of its capital. The department has an area of about 24,000 square miles, and is traversed by both chains of the Cordilleras and watered by numerous rivers. It produces coffee, sugar, cotton, etc. The capital, situated on the main road from Lima to Cuzco, has a cathedral and a university. It was founded by Pizarro in 1539, and long known as Huamanga. A battle took place here, one of the most celebrated in the history of South America, having been decisive of the independence of upper and lower Peru. See AYACUCHO, BATTLE OF. Pop. of town 22,000.

Ayacuchco, *ä'ya-koo'chō*, **The Battle of**, a decisive engagement in the South American struggle for liberty; was fought on 9 Dec. 1824, at and near the Peruvian town of that name. On the one side was the Spanish viceroy of

Peru with nearly all that remained of the Spanish power in its last stronghold upon the continent; on the other Gen. Sucre, second in command to Bolívar (the latter not being present), with Colombian troops, and Peruvians led by Gen. Lamar. The viceroy was taken prisoner; the utter defeat of his army made possible the independence of Bolivia (realized the following year), and strengthened the republican governments in all the neighboring states.

Ayala, *a-yà'la*, **Adelardo Lopez de**, a Spanish dramatist. b. Gaudalcanal, Badajoz, March 1820; d. 30 Dec. 1879. After studying law in Seville, he went to Madrid, where he devoted himself entirely to poetry and speedily won national fame. His first drama, 'A Statesman' (1851), met with immediate success, and was followed in the same year by 'The Two Noblemen' and 'Penalty and Pardon'. To the modern comedy of manners, his specific domain, he first contributed 'The Glass Roof,' and in 1861 attained to wide reputation with 'Percentage.' Of his other works the most noteworthy are 'The Modern Don Juan' (1863); and 'Consuelo' (1878), a drama.

Ayala, *Lopez de*, Spanish historian and poet. b. 1332; d. 1407. He was a prominent statesman and warrior during the reigns of the Castilian kings Pedro the Cruel, Henry II, John I, and Henry III, and is known as the author of a 'Chronicle of the Kings of Castille' (his contemporaries), in which the crimes of Pedro the Cruel are detailed and drawn in colors said to be sometimes overcharged.

Ayamonte, *a'ya-mōn'tā*, a seaport town in Spain, near the mouth of the Guadiana, which here forms the boundary between Spain and Portugal.

Aycock, **Charles Brantley**, American politician. b. Mahunta, now Fremont, Wayne County, N. C., 1 Nov. 1859. He was educated at the University of North Carolina, studied law and began the practice of his profession at Goldsboro, N. C. in 1881. In 1893 he was appointed United States district attorney for the eastern district, and in 1900 was elected governor of North Carolina by a majority which was the largest ever given to a gubernatorial candidate in that State.

Aye-Aye, *äi'äi'* (native Malagasy name; from its cry), a lemur (*Daubentonia madagascarensis*), about the size of a rabbit, and with teeth like a bat. It is small and brownish, with a long bushy tail. Arboreal and nocturnal in habit, it lives in bamboo jungles feeding on vegetables and the larvae of certain borers. Its feet, as well as its hands, have opposable thumbs, and exceedingly long, naked, flexible-fingers armed with pointed nails, suitable for extracting grubs out of deep crevices.

Ayeen, *ä-yēn'*, or **Akbery**, a valuable statistical description of the Mogul empire as it was in the reign of Akbar. It was compiled by Abul Fazi, the vizier of the Emperor Akbar. There is an English translation of it by Gladwin.

Ayesha, *a-yē'shā*, the daughter of Abubekr, the favorite wife of Mohammed: b. 610 or 611; d. 677 or 678. After Mohammed's death she opposed the succession of Ali, raised an army against him, and was taken prisoner, but dismissed with that spirit of chivalry which had already arisen among the Arabians.

AYLESBURY — AYR

Aylesbury, ălz'bēr-ī, a market town in Buckinghamshire, England, 38 miles northwest of London, in the centre of the fertile valley of Aylesbury. There are many old houses, irregularly but picturesquely built. The parish church of St. Mary is a fine early English edifice, and there are various other places of worship; a county-hall, market-house, clock tower, and corn exchange. There are also baths, a large county hospital, and the only convict prison for women in England. The chief industries are printing, making condensed milk, and poultry-raising for the London market, Aylesbury ducks being widely known, and there are several breweries and flour-mills. Pop. (1901) 9,244

Aylesbury Duck. See DUCKS.

Aylesford, ălz'ferd, a town in Kent, England, three miles from Maidstone. In its vicinity is the remarkable monument called Kit's Coty House, a kind of Druidical cromlech.

Ayllon, i-lŷon, **Lucas Vasquez de**, Spanish adventurer: b. about 1475; d. 1526, who, in 1509, occupied the position of counsel at the supreme court of St. Domingo, and was subsequently employed by Fernando Cortes, on a mission to Velasquez. In 1520, he joined an expedition to Florida, treacherously captured a great number of natives, and proposed to found a new colony, but was unsuccessful, and is supposed to have lost his life while engaged in a second expedition to Florida.

Aylmer, ăl'mēr, **John**, English prelate: b. Norfolk 1521; d. 1594. He was tutor to Lady Jane Grey. On the accession of Mary, he was forced to leave his country, but when Queen Elizabeth came to the throne he returned to England; and in 1576 was made bishop of London.

Ayl'mer, Matthew, Canadian military officer: b. Melbourne, P. Q., 28 March 1842. He entered the British army in 1864; retired from the imperial service and entered the Canadian volunteer militia in 1870; and became adjutant-general of the Dominion militia, the highest military office in Canada next to that of the major-general commanding, in 1896.

Ayl'mer-Gowing, Emilia, English poet and reciter: b. Bath, October 1846. She was educated partly in Brighton, partly in Paris, where she received the attention of Lamartine. After a short career on the stage she successfully produced two dramas, 'A Life Race,' and 'A Crown for Love.' Her 'Ballads and Poems,' and 'The Cithern' have become popular, as well as two novels, 'The Jewel Reputation,' and 'An Unruly Spirit.' In 1891 she published 'Ballads of the Tower and Other Poems.'

Ayl'mer, Lake. (1) A Canadian lake, lying 80 miles north of Great Slave Lake on the margin of the forest area. (2) A Canadian lake in Quebec, about 70 miles south of the city of Quebec.

Ayl'offe, ă'lōf, **Sir Joseph**, an English antiquary: b. about 1708; d. 1781. He was one of the first council of the Society of Antiquaries, a commissioner for the preservation of state papers, and author and editor of several works, of which the best known is his 'Calendars of the Auntient Charters,' etc.

Aymaras, i'mā-răz', an Indian race of Bolivia and Peru, speaking a language akin to the Quichua. They are physically characterized by great chest development, caused by the rarefied air of the region they inhabit.

Aymon, ă'môn, the surname of four brothers, called respectively Alard, Richard, Guiscard, and Renaud, sons of Aymon or Haimon, Count of Oordogne, who figure among the most illustrious heroes of the chivalric poetry of the Middle Ages; but their historic existence must be considered problematical. Their career furnished rich material to the romantic narratives of Italy in the 15th and 16th centuries. A novel, entitled 'The Four Aymon Brothers,' by Huon de Villeneuve, a French poet of the age of Philip Augustus, details very minutely their exploits, and Ariosto conferred a poetical immortality on the family by the publication of his 'Roland,' in which Renaud, the bravest of the four brothers, plays continually the most distinguished part.

Ay'oubites, or **Ayyubites**, the Saracenic dynasty founded by Saladin, which in Egypt supplanted the Fatimite caliphs, about 1171 A.D. Several of the descendants of Saladin, known as Ayoubites, afterward ruled in Egypt, Syria, Armenia, and Arabia Felix. In the 13th century their power was destroyed by the Mamelukes.

Ayr, ăr, a town in Scotland, on the river Ayr, and 34 miles south-southwest of Glasgow. The principal streets of modern Ayr are spacious and well paved, and many of the buildings handsome. The most important edifices are several churches of the various denominations, the town-hall and connected offices, in great part completed in 1881, surmounted by a fine spire of older date, 226 feet high; the county buildings; the academy, a celebrated educational institute, the buildings of which are handsome and commodious; the Wallace tower, 115 feet high on the site of a more ancient tower; the free library; the railway station and hotel; a hospital; etc. There is a handsome esplanade along the sea front 1,500 yards long. Two bridges connect Ayr with Newton and Wallacetown, incorporated in the burgh. One of these, opened in 1879, occupies the place of the "New Brig" of Burns' 'Brigs of Ayr,' the "Auld Brig" (built 1252) being still serviceable for foot traffic. There is now also a third bridge farther up the river, besides the railway bridge. Ayr exports manufactured goods, iron, coal, whetstones, etc.; and imports iron-ore, grain, timber, slates, bricks, etc. The harbor lies within the mouth of the river, and is enclosed and protected by a north and a south pier and a breakwater; there being also a wet dock and a slip dock. Shipbuilding is carried on, also tanning, boot and shoe making, the manufacture of carpets, lace curtains, etc. The poet Burns, as is well known, was born in a house which stands within one and one half miles of the town, between it and the church of Alloway ("Alloway's auld haunted kirk"), and a monument has been erected to his memory on a height between the church and the bridge over the Doon. Pop. (1901) 28,624.

Ayr, a river of Ayrshire, Scotland, which after a course westward of 18 miles, finally loses itself in the Frith of Clyde below the town of Ayr.

AYRER—AYUNTAMIENTO

Ayrer, i'rer, Jacob, German dramatist: b. Nuremberg about 1560; d. there, 26 March 1605. Between 1595 and 1605 he wrote more than 100 plays, of which the 'Opus Theatricum' (Nuremberg 1618) contains 30 tragedies and comedies, and 36 Shrovetide plays and vaudevilles. In his dramas the influence of the English stage is apparent.

Ayres, ārz, Alfred. See OSMUN, THOMAS ERMBLEY.

Ayres, Anne, American author: b. England, 1816; d. February 1896. She was the first member of an American sisterhood in the Protestant Episcopal Church. She wrote 'Evangelical Sisterhood' (1867); and 'Life of Augustus Muhlenberg.'

Ayres, Romeyn Beck, American soldier: b. East Creek, N. Y., 20 Dec. 1825; d. New York 4 Dec. 1888. He served in the Federal army during the Civil War, and at its close was brevetted brigadier-general and major-general in the volunteer and regular service.

Ayr'shire, an extensive maritime county of Scotland, about 60 miles in length, with a breadth varying from 10 to 26 miles. Its coast line is about 75 miles in length, has several excellent harbors. The singular rock off the coast, known by the name of Ailsa Craig, belongs to the county, as also do one or two other islets. The surface has no great elevations, the highest summits varying from about 1,200 to 1,900 feet. The principal streams are the Ayr, Stinchar, Girvan, Doon, Irvine, and Garnock.

The mineral riches are very considerable. Coal is abundant, especially in the middle and northern parts of the county, and there are over 100 collieries. Extensive seams also of black-band ironstone exist, and are now being actively worked. Ayrshire having become the great seat of the iron manufactures of Scotland next to Lanarkshire. Plumbago is found in some localities; and lead, antimony, and copper are also met with. Limestone and freestone abound. Millstones, of coarse granite, much esteemed for their hardness and durability, are quarried near the north coast, in the district of Cunninghamham.

The native sheep are bred in great numbers; their wool is coarse and scanty, but the flesh is excellent. The horses of Ayrshire are of superior breed, being hardy, strong, and of large size. The woollen manufactures are extensive, particularly carpets, bonnets, and worsted shawls, which are produced in great quantities. On the coast is the ancient castle of Turnberry, in which Robert Bruce, king of Scotland, is said to have been born, and where he is known to have spent many of his youthful years. It was here that a fire, accidentally kindled, was mistaken by Bruce for an appointed signal, and caused him to cross the sea from the island of Arran opposite to attempt the deliverance of his country. Of the ecclesiastical ruins the most interesting is the abbey of Crossraguel, founded in 1244. The chief towns are Ayr, Kilmarnock, Irvine, Troon, Saltcoats, Largs, and Ardrossan. Pop. (1901) 254,436.

Ayrton, ār-tōn, William Edward, English electrician and inventor: b. London 1847. He entered the Indian telegraph service, having studied electrical engineering with Prof. William Thomson; became electrical superintendent and introduced throughout India the system of de-

termining the position of a fault by electrically testing one end of a line. In 1873-9 he was professor of natural philosophy and telegraphy at the Imperial College of Engineering in Japan; in 1879 became professor of applied physics in London Technical College, and, in 1884, chief professor of physics at the Central Institute, South Kensington. He was elected president of the Institute of Electrical Engineering in 1892. With Prof. Perry, he invented the ammeter, voltmeter, electric power meter, ohmmeter, and dispersion-photometer; and, with Profs. Jenkin and Perry, the system of telerphage. He has been a voluminous writer and is widely known for his 'Practical Electricity.'

Aytoun, ā'toon, Sir Robert, Scottish poet: b. 1570; d. London, March 1630, and studied at St. Andrews. He addressed an elegant panegyric in Latin verse to King James on his accession to the crown of England, which had, no doubt, some influence in securing to the author the favor of that monarch. He was at a later period of his life honored with the appointment of secretary to Henrietta Maria, queen of Charles I. During his residence abroad, as well as at the court of England, he lived in intimacy with, and secured the esteem of, the most eminent persons of his time. The poems of Sir Robert Aytoun, for the first time published together in the Miscellany of the Bannatyne Club, are few in number, but are distinguished by their elegance of diction. Several of his Latin poems are preserved in the work called 'Delitizæ Poetarum Scotorum' (1637).

Ay'toun, William Edmondstoun, Scottish poet and prose writer: b. Edinburgh, 1813, d. Blackhills, Elgin, 4 Aug. 1865. He studied at the University of Edinburgh, and passed as advocate in 1840. His first independent work was the 'Life and Times of Richard I' (1840). In 1848 he published a collection of ballads entitled 'Lays of the Scottish Cavaliers,' which has continued to be the most popular of all his works, and has passed through numerous editions. It was followed in 1854 by 'Firmilian, a Spasmodic Tragedy'; in 1856 by the poem of 'Bothwell'; and in subsequent years by the novel called 'Norman Sinclair,' and various other original works. In 1858 he issued a critical and annotated edition of the 'Ballads of Scotland.' The translation of the poems and ballads of Goethe which he undertook in conjunction with Theodore Martin was less successful than some of his other works. In 1845 he was appointed professor of rhetoric and English literature in the University of Edinburgh—a position which he held till his death. In 1854 he became editor of 'Blackwood's Magazine.'

Ayuntamiento, a-yoon'ta-myān'tō, the name given in Spain to municipal councils. Firmly established during the struggles with the Moors, the ayuntamientos acquired great influence and political power, the nobility being admitted to them without their class privileges. The Cortes, in 1812, adopted the leading features of the former system. On the return of Ferdinand VII., the ayuntamientos were abolished, but restored in 1837. The ayuntamientos were empowered to make up the lists of electors and jurors, to organize the national guards, to command the police within their own bounds, to direct the apportionment and raising of taxes, and

AZALEA — AZIMUTH

to manage the funds of the commune. The municipal law of 1870 deprived them of all political authority, and regulated them as administrative bodies, subject in certain respects to the authorities of the provinces, the law courts, and the Cortes.

Aza'lea, a genus of about 25 species of shrubs of the natural order *Ericaceæ*, natives of the northern hemisphere, principally of eastern Asia and North America. By some botanists the genus is united with *rhododendron* (q.v.), as may be seen below. The species have deciduous or evergreen leaves and showy, often fragrant flowers, usually in terminal umbel-like racemes. They are commonly divided into two groups: the Indian azaleas and the hardy deciduous azaleas, including the Ghent hybrid forms. The Indian azaleas, mostly imported from Holland and forced in greenhouses, are propagated by grafts or cuttings, rarely by seeds. They are planted in loose, moderately fertile soil; sheltered from the sun and watered freely during the summer; repotted in early autumn; and, by special attention, brought into flower as desired from late autumn until early summer. The leading species of the group is *A. indica* (*R. indicum*), of which two varieties, *amara* and *kamoferi* are fairly hardy as far north as New Jersey. The members of the hardy group need some protection in the north and in exposed situations to prevent injury to the flower-buds due to sudden variations of temperature. Named varieties are usually propagated by grafts or by cuttings. Seedlings are often grown for their own merits, but are generally used for stocks upon which to graft choicer varieties. The following are among the best known species of this group: *A. vaseyi* (*R. vaseyi*), an excellent North Carolina species with spotted flowers which appear in early May; *A. nudiflora* (*R. nudiflorum*) pinxter-flower, found from Canada to the Gulf of Mexico, has pink, white, or sometimes purple flowers in mid-spring; *A. calendulacea* (*R. calendulaceum*), found from Pennsylvania to Georgia, has large orange- or flame-colored, particularly handsome blossoms in late spring; *A. occidentalis* (*R. occidentale*), a California species, bears fragrant, white, pinkish flowers in early summer; *A. arborescens* (*R. arborescens*), found in the Alleghany Mountains, has fragrant white or pink flowers in June; *A. viscosa* (*R. viscosum*), clammy azalea or white swamp honeysuckle, is found in swamps from maritime Canada to Florida and westward to Arkansas, and bears fragrant white or pink flowers in June or July. Among the Asiatic members of this group the best known are probably: *A. mollis* (*R. molle*); *A. rhombica* (*R. rhombicum*); and *A. pontica* (*R. ponticum*). Consult: Halliday, 'Treatise on the Propagation and Cultivation of Azalea Indica'; Van Geert, 'Iconographie des Azalées'; Bailey and Miller, 'Cyclopedia of American Horticulture.'

Azari'as, Brother (PATRICK FRANCIS MULLANY), b. 29 June 1847, near Killenaule, County of Tipperary, Ireland; d. 20 Aug. 1893, Plattsburgh, N. Y. (Cliff Haven). His father emigrated to the United States in 1851, leaving Patrick, his eldest son, in Ireland a few years on account of his health. Deerfield, N. Y., a place near Utica, was the new home, where he at-

tended the public school and later the Christian Brothers' academy in Utica. At the early age of fourteen he decided to become a Brother, and on June 29, 1862, Patrick Francis Mullany received the black habit and white collar of a Christian Brother, and henceforth became known to the world as Brother Azarias. At the age of seventeen he was put in charge of a large class; and at the age of nineteen he was professor of mathematics in Rock Hill College, near Baltimore, Md. Ten years later, he was made head of the college. His first book, 'An Essay Contributing to a Philosophy of Literature' (1874), won him the respect of scholars. His philosophical articles on literature, published in various magazines, were well received, and he was soon in demand as a lecturer before educational bodies, Catholic and non-Catholic. When in the 80's he went to Europe, he found friends everywhere; scholars who had read his books, men like Cardinal Newman greeted him as a friend. He was a promoter of the Catholic Summer School of America, and of several other educational movements. After finishing his course of lectures at the Catholic Summer School at Cliff Haven, 1893, he was too ill to go home or to any of the other meetings where he was expected. His last days were spent in 'Blue Point Hotel,' near the Summer School grounds. His published works are: 'Aristotle and the Christian Church'; 'Books and Readings'; 'Culture of Spiritual Sense'; 'Development of English Literature'; 'Development of Old English Thought'; 'Essays Educational'; 'Essays Miscellaneous'; 'Essays Philosophical'; 'Mary, Queen of May'; 'Mary, Queen of May and Essays'; 'Phases of Thought and Criticism'; 'Philosophy of Literature'; 'Psychological Aspects of Education.'

Azeglio, ad-zá'lyō, **Massimo Taparelli, Marquis d'**, Italian author, artist, diplomatist, and statesman. b. Turin, 1801; d. 16 Jan. 1866. In 1816 he accompanied his father to Rome, and there occupied his time principally with painting and music. He was already favorably known as a painter, when, in 1830, he went to Milan, married the daughter of Manzoni, the great novelist, and wrote several romances. The earliest of these, 'Ettore Fieramosca,' was received with great enthusiasm. His next romance, 'Niccolò de Lapi,' became equally popular, and is esteemed by Italian critics the best historical novel in any language. Deeply imbued with the spirit of Italian nationality, in 1842 Azeglio made a tour through the provinces of Italy, awakening the revolutionary spirit which troubled the last years of Gregory XVI. After the revolution of 1848 he supported the cause of the king of Piedmont, and, at the head of the papal troops, fought against the Austrians at Vicenza, where he was wounded. In 1849 Victor Emmanuel appointed him president of the cabinet of ministers, an office which he resigned in 1852 to his political adversary, Count Cavour. In 1859, after the peace of Villafranca, he undertook a confidential mission as ambassador extraordinary to England; and was afterward appointed governor of the city of Milan.

Az'imuth, in astronomy, the arc of the horizon comprehended between the meridian of the observer and the vertical circle passing through the star. It is easterly if the star is

AZOBENZENE — AZOV

observed before, westerly if after, and zero if at the time of culmination. It is usual to connect with the quadrant a graduated, horizontal circle, called the *azimuth circle*.

Azio, Greece, a village on the gulf of Arta, in the district and promontory of the same name. A German archæologist, Dr. Erlinger, succeeded, in 1857, after several years' investigation, in ascertaining the position of the camps of Antony and Augustus, precisely as it was on the eve of the battle of Actium. He found the camp of the latter surrounded by a cincture of redoubts about $5\frac{1}{2}$ miles in extent, which were constructed in stone, and protected by a ditch. In advance of the camp were external works, consisting of several small forts of observation, one of them serving as a telegraph for communicating with the fleet. In the ruins of one of these forts was discovered a tablet in steel, on which signals are traced, resembling somewhat those of the aerial telegraphs.

Azkar Tuarik, an African tribe of the Tuariks, who inhabit the desert country between Ghat on the north and the tracts of the Kelowi Tuariks on the south, between lat 21° and 26° N. They were first visited and made known to the European world by the British central African expedition of Barth, Overweg, and Richardson. The country in the north is a barren plain, with scarcely any vegetation, and with isolated granite peaks, and few or no animals. The southern portion, bordering on the Kelowi Tuariks, is the uninhabited central region of the great desert. The inhabitants of Azkar, like the rest of the Tuariks, belong to the Berber and not to the negro race. They are fanatical Mohammedans in religion, hating both Pagan and Christian. They are monogamists. They are a warlike aristocracy, divided into 5 *tyusi*, or clans, and subdivided into 30 divisions or *fayas*, each of which has a separate chief.

Azmari, the name applied to a set of vagrant beggars in Abyssinia, part of whom form the music bands of the Abyssinian army, while the rest exercise their musical voices in the street, especially on religious holidays.

Azo, or **Azzo**, or **Azzolinus**, **Portius**, an Italian lawyer, d. in 1200. He professed jurisprudence at Bologna with such éclat that the college could not contain all his auditors, so that he had to take to the public square.

Azoben'zene. See **BENZENE**.

Az'o Colors. See **COAL TAR COLORS**.

Azo'ic, the name given to the earliest geological period, before the appearance of life on the earth. It includes the oldest rocks, mostly granites, gneisses, and schists, in which there are no traces of organic remains. The term is practically synonymous with *Archæan*.

Azores, or **Western Islands**, a Portuguese archipelago, in the mid-Atlantic, between lat $36^{\circ} 55'$ and $39^{\circ} 55'$ N. and between lon $25^{\circ} 10'$ and $31^{\circ} 16'$ W. Stretching over a distance of 400 miles, their nine islands are divided into three distinct groups—Sta Maria and São Miguel in the southeast; Terceira, São Jorge, Pico, Graciosa, and Fayal in the middle; and Flores and Corvo in the northwest. Of these, Flores lies 1,176 miles west of Cape Rocca in Portugal, 1,484 miles southwest of Falmouth, and 1,708 miles east-southeast of Halifax. In 1431–53 the Azores were taken possession of by the Portuguese. They were at that time unin-

habited; but that they had been visited by the Carthaginians is proved by Punic coins found on Corvo. They seem to have been known to the Arabian geographer Edrisi in the 12th century; and they are marked distinctly on a map of 1351. The Portuguese colonists called the whole group Azores, from *azor* or *azor*, a hawk; and they named two individual islands, Corvo and São Jorge, from Corvi Marini and San Zorze, which, according to a map of 1375, had been previously seen in the western ocean. In 1466 Alfonso V. made a life grant of the island of Fayal to his aunt, the duchess of Burgundy, and from this circumstance many settlers migrated thither from Flanders.

The total area of the group is 919 square miles, and the population (1890) 255,594. The area, population, and the maximum altitude of the different islands are as follows: Sta Maria (38 square miles; 5,880; 1,889 feet); São Miguel (299 square miles; 107,000; 3,854 feet); Terceira (164 square miles; 45,391; 3,435 feet); Graciosa (24 square miles; 8,718); São Jorge (91 square miles; 18,000); Pico (173 square miles; 27,904; 7,613 feet); Fayal (69 square miles; 26,264); Flores (54 square miles; 10,700; 3,087 feet); Corvo (7 square miles; 1,000). The capital is Angra, in Terceira; but Ponta Delgada, in São Miguel, is a larger town. The Azores are of volcanic origin, and with the exception of Corvo, Flores, and Graciosa, are still liable to eruptions and violent earthquakes, the worst of 21 shocks since 1444 having been those of 1591, 1638, 1719, and 1841. Hot mineral springs are numerous; and the baths of Furnas, in São Miguel, are much resorted to by invalids. The coast is generally steep and rugged; the interior abounds in ravines and mountains. Perhaps the greatest want of the group is a good harbor. The Azores are regarded as a province, not a colony, of Portugal, and as belonging to Europe.

Az'ote, a name formerly given to nitrogen; hence substances containing nitrogen and forming a part of the structure of plants and animals are known as azotized bodies. Such are albumen, fibrine, casein, gelatine, urea, kreatine, etc.

Az'otine, a substance procured by decomposing wool by the action of steam at 150° C. under a pressure of five atmospheres; the product, afterward dried by evaporation, contains nitrogen completely soluble in water. Azotine is mixed with dried blood for a fertilizer.

Azov, a-zōf', a town in the south of Russia, on the Don, seven miles from its mouth. The sand and mud deposited by the river have choked up the port, so that its trade and shipping have dwindled away, and the inhabitants depend mostly on fish-curing. Azov was built nine miles from the site of the ancient Greek colony of Tanais; and when, in the 13th century, it was taken possession of by the Genoese, they altered its name to Tana. They were driven out of it by Timur (Tamerlane) in 1392. In 1471 it was taken by the Turks, and in 1696 by Peter the Great; and it was finally ceded to Russia in 1774. Pop. (1897) 27,500.

Azov', Sea of (ancient *Palus Mæotis*), an arm of the Black Sea, with which it is united by the Straits of Kertch. Its length, southwest to northeast, is about 168, its breadth about

AZPEITIA — AZTEC CONFEDERACY

80 miles; greatest depth, near its north side, not more than 8 fathoms. The western part, called the Putrid Sea, bordering on the Crimea, is separated from the main expanse by a long sandy belt, called Arabat, along which a military road has been formed. The sea teems with fish. Of the islands it contains, Benesch, the largest, has an area of 65 square miles.

Azpeitia, ath-pā'e-tya, a town in Spain, 18 miles southwest of San Sebastian. A mile from it is the famous convent of Loyola, now converted into a museum and built by the Roman architect, Fontana, in 1683. It includes the tower of the Santa Casa, in which St. Ignatius of Loyola, the founder of the Society of Jesus, was born in 1491. Here every year in July a great festival is held in his honor, to which pilgrims flock from all quarters. Pop. about 7,000.

Azrael, āz'rā-ēl, in Mohammedan mythology, the angel of death.

Az'rek, the principal stream of Abyssinia, which, after a winding course through Abyssinia and Sennaar, falls into the Nile above Gerra.

Az'tec Club, an organization formed to preserve the memories of the war in Mexico, established in Mexico in 1847.

Az'tec Confederacy. The name Aztecs (properly Aztecas) is currently used for all the Nahuatl (q.v.) tribes in Mexico at the time of the Spanish conquest. It belongs at most only to the seven more closely cognate tribes which occupied the valley of Mexico, and is by some restricted to the one tribe which built Tenochtitlan, or Mexico City, and is so used for convenience here. The name is from the unidentified place (generally assumed as northward) whence they came, Aztlan, variously interpreted as "heron place," "heron-clan place," "white place," and "seacoast"; the best opinion makes it Jalisco or Michoacan, on the west coast of Mexico. Apparently some time from the 9th to the 11th century they invaded the plateau of Anahuac ("waterside," lake district), where tribes of the same stock were already living, and took possession of several commanding points; the chief pueblo being that of the Aztecs or Toltecs at Tollan (now Tula), some 40 miles north of Mexico City, a leading pass from the north into the valley of Mexico. Driven from this by the warfare of the other natives the Aztecs moved south into the valley, and established themselves in the salt marshes where the outlet of lakes Chalco and Xochimilco flows into Lake Tezcuco, amid which in 1325 (the first absolutely sure date in their history) they built Tenochtitlan, now the city of Mexico. They converted it by dikes and causeways into an island, and gradually made it another Venice, a stone town intersected with canals, the strongest position in Mexico. For more than a century, however, they were tributary to the great pueblo of Azcaputzalco, near them on the western shore of the lake. Gradually they formed a stable military organization and more stable civil society; in 1375 they elected their first "chief of men," war chief and priest in one—Acamapichtli, often styled in books "the founder of the Mexican empire"; and under the fourth chief, Izcoatzin, allied themselves with Tezcuco on the eastern lake

shore. The two destroyed Azcaputzalco about 1430 and deported the surviving inhabitants to Tlacopan, near Mexico, which was made tributary to the latter. Tenochtitlan, Tezcuco, and Tlacopan then formed a league (the Aztec Confederacy, formerly termed the "Aztec empire"), purely for plunder and tribute, not at all for government or incorporation. The tribute was not only of food and similar supplies, a certain amount of land being cultivated for the benefit of the confederacy, but what was still more coveted, human victims for their gods, to be afterward eaten by themselves; sometimes of warriors for raids on others. The spoil was divided into five parts, Tenochtitlan and Tezcuco each taking two and Tlacopan one. In its less than a century of life, this league made some 30 pueblo towns tributary, principally to the east toward the gulf and south-east toward the Isthmus of Tehuantepec—a range of 8,000 or 10,000 square miles out of the 750,000 in the present Mexico. Even this was in no sense a military occupation of the country, much less the foundation of a state. Within a few dozen miles were great independent pueblos such as Cholula and Tlascala, the latter a strong and warlike settlement of some 30,000 people, who waged war to the knife with the Aztec confederacy, defeated their plundering assaults again and again, and aided other pueblos in resistance. Montezuma (q.v.), who acceded 1502, was heavily defeated by them and by the towns in Michoacan, but won success on the gulf coast; and when the Spaniards came, the southern Mexican peninsula was a mass of seething savage hatreds and feuds, no two tribes of the natives having any community of feeling or interest that could prompt them to unite with one another rather than with the foreigner. See CORTES; MEXICO; MONTEZUMA.

The Aztec tribe was divided into 20 clans or *calpulis*, each clan occupying several contiguous communal houses, each of which held several hundred persons; besides a clan office building where assemblies were held and strangers entertained. It was governed by an elected council, with a civil and a military head as in Rome, the latter being also constable. Each clan had its special rites, priests, and temple. It was divided into four phratries, each having among other duties that of exacting compensation for murders, and each ward had its own precinct, constituting four wards or quarters of the town, its arsenal, and its captain. These captains were called "darthouse-man," "man-slasher," "bloodshedder," and "chief of the eagle and cactus," the latter being chief executioner, and not eligible for the chieftainship of the tribe. The supreme government of the Aztecs was by a council of 20, one from each clan, who must not be a sachem, but a member of the clan council; he was called the "speaker," and the tribal council the "speech-place" (parliament, literally). It met every 10 days at least, and oftener if called together. Once in 80 days there was a special session attended by all the leading clan and phratry officials and priests, to reconsider unpopular decisions. The tribe, too, had a dual executive, civil and religious: a sachem who was civil magistrate and chief judge; and a war chief called "chief of men," and also some priestly functions, though there was a high priest also.

AZTEC TREASURE-HOUSE — AZZUBEYDI

He was originally chief only of the Aztecs; but about 1430 (probably on occasion of the destruction of Azcapotzalco), was made chief of the confederate army. He was elected by the tribal council and the clan war chiefs and leading priests, and could be deposed by them. His official residence was in the tribal office. From the time of the first chief, Acamapichtli, the office remained in a single family, like the old Aryan kingship.

The social and religious organization was a peculiar mixture of the lowest barbarism and the beginnings of civilization. There was no private property in land or dwellings; each man could keep a garden plot for his use, but it was his no longer than he used it. Family life had emerged from savage promiscuity: descent was reckoned in the male line, marital infidelity was punished, and remaining unmarried was not permitted except by special dispensation,—contumacy being punished by being made an outcast, a serf if a man and a prostitute if a woman. Slavery had thus begun in a small way; but the habitual use of prisoners of war as slaves had not, it being preferable to sacrifice and eat them. Agriculture was still primitive; but irrigation was practised to some extent, and horticulture was beginning to develop. The roads were only narrow trails; but they facilitated collection of tribute, and served military and trading purposes as well. The houses were generally of adobe brick, but many of the great pueblos were of stone, so that the towns looked like castellated cities. There were tessellated marble floors, finely worked and colored tapestries, and beautiful feather-work, vases, goblets, and censers of fine marbles and precious metals exquisitely wrought. There were regular weekly markets, which, though trade was by barter, indicated a large development of personal property and of superfluity above subsistence. There were elaborate pleasure-grounds, menageries, and aviaries, baths and fountains, and pleasure performances of dramas and singers, acrobats and jugglers. Yet the people were cannibals, and their religion was of the most hideous character, albeit with regularly organized priesthood and temples and altars. On one side the society touched the South Sea Islands, on the other it almost rose to ancient Egypt and was above Homeric Greece.

Aztec Treasure-House, The, a romance by Thomas A Janvier. It purports to be a narration of the thrilling adventures of a certain Prof. Thomas Palgrave, Ph.D.; an archaeologist who goes to Mexico to discover, if possible, remains of the early Aztec civilization.

Azuay, ā-thoo-ī', a province of Ecuador, with an area of about 11,150 square miles. The cinchona tree is found here in abundance. Pop. (1890) 132,400.

Azulai, a'zoo-li, **Hayim David**, 18th century Jewish bibliographer: b. Jerusalem. His life was mainly spent at Leghorn. Of his numerous works, the best known is 'Shem-ha-Gedolim' (the names of the great), a bibliography containing the names of over 1,300 Jewish authors and more than 2,200 of their works.

Azuni, ad-zoo'ne, **Domenico Alberto**, Italian jurist: b. Sassari, Sardinia, 1749; d. 23 Jan. 1827. He became judge of the tribunal

of commerce at Nice, and in 1795 published a work in which he endeavored to reduce maritime laws to fixed principles, and which appeared in French in 1805, under the title of 'Droit Maritime de l'Europe.' Napoleon appointed him one of the commissioners for compiling the new commercial code.

Azure, the heraldic term for the color blue, represented in engraving by horizontal lines.

Azurine, a European cockroach, blue in color.

Azurite, one of the commonest ores of copper, a basic copper carbonate, having the formula $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$. Its hardness is 3.5 to 4 and specific gravity about 3.8. It is a mineral of rare beauty, its usual color being a rich Prussian to azure blue, from which fact its name is derived. Its color is, however, often so dark as to appear nearly black, this frequently being true of its crystallized forms. These are very varied and complex, and belong to the monoclinic system. They are often transparent and have a most brilliant vitreous to adamantine lustre, and are beautifully striated, while their frequent association with bright green malachite adds much to the beauty of the specimens. These two minerals sometimes occur in stalactitic forms, the one encircling the other. Such specimens have been extensively cut and polished in cross sections and worked up for various ornamental purposes. The finest material of this kind comes from Morenci, Arizona, this locality also yielding exceptionally fine crystallized specimens rivaling those from its other most celebrated localities, Bisbee, Ariz., and Chessy, France. Its occurrence at the latter locality, which has been famous for many years, has led to the frequent use of the name "chessylite" for azurite, especially in Europe. Many other localities yield choice specimens, the copper mines of the western portion of the United States being especially celebrated. In New Mexico curious pseudomorphs of native copper after azurite "balls" occur in large numbers, while pseudomorphs of malachite after azurite are very common.

Azymites (Lat. *azymus*, unleavened), a term applied by the Eastern to the Western Church because the latter used unleavened bread in the administration of the Eucharist. In the Western Church the point has never been regarded as of vital importance. The matter was considered at the Council of Florence (1439). The Western Church, called the Greek schismatics Prozymites.

Azzarkal, az'ar-kāl', Arabian mathematician and astronomer: b. Cordova in the first half of the 11th century. He was royal astronomer of Al-Mamoun, king of Toledo. He invented divers instruments for making observations, constructed a water-clock of extraordinary dimensions, as well as a planisphere and an astrolabe, upon new principles.

Azzubeydi, a'zoo-bi'dē, **Mohammed Ibn el Hasan**, Arabian lexicographer: b. Seville, 927; d. 982. He was cadi of Seville and preceptor of Hiscam, son and heir of the Sultan. He wrote an abridgment of the great biography of the Spanish grammarians, by Khalil; a treatise on grammar, and a work upon the character of the syntax of the Arabic language.

B

B the second character in our alphabet, holds the same relative place in the alphabet of all European languages except the Russian and two or three others, as Servian and Bulgarian: in these alphabets the symbol B holds the third place, yet it stands not for our mute B but for a labial (not denti-labial) V or W; while in the second place stands a modified form of B with the same phonetic value as our B. The Russian alphabet is derived from the scheme of the monk Cyril, one of the first evangelists of Bulgaria, who translated into the language of the Sclavonians parts of the Bible. To do this it was necessary to contrive new characters for designation of sounds alien to the Greek language, and to modify existing Greek characters. But as in his time,—the 9th century,—and at a much earlier date, the current phonetic value of B was, as it still is, labial V, Cyril retained the symbol B as representing that V sound, while for the mute labial B he devised the symbol Б. With this exception the character B has from immemorial time held the second place in the alphabets of all the Aryan languages of Europe, as well as in Hebrew and Aramaic, Phœnician, Arabic, and Coptic. The most ancient form of this symbol, both in Greek and Latin, was **β** with two angular loops, which were afterward rounded. The most ancient form of the symbol B among the Phœnicians was not unlike the Arabic figure 9, namely, ٩. The Greeks not only added a second loop but they reversed the position of the loop by setting it on the right of the upright stem; and they similarly transposed the loop of the Phœnician sign ٩ which they made P (rho, our R). The difference between the two labials B and P is that P is an absolute mute, in pronouncing which the voice is completely obstructed before the lips are drawn apart, while B is sonant, though the lips be still compressed: in the effort to pronounce B the voice is heard even before the lips are parted; but in pronouncing P no sound is heard while the lips are compressed; and when they are opened there is emission of breath but no voice. B and P substitute each other in words common to two or more languages and in transmutations of words within one language. Examples: Latin *pila* is English and German *ball*. *Bretzel* is commonly pronounced *pretzel*; but it is of the same origin as the English word *bracelet*, from Latin *brachiale*, an armlet, bracelet; and *bretzel* means also handcuffs. B is nearly allied also to F, Th, V, and W; thus beech (German *buche*)

is represented in Greek by *phegos* and in Latin by *fagus*; whale is from the same source as Greek *phalaina* and Latin *balaena*; *habere* in Latin becomes in French *avoir*; *caballus*, Latin, is French *cheval*; German *liebe*, English *love*; Latin *labium*, French *lèvre*. V and B are little discriminated in Spanish and we have in one of the epigrams of Martial proof that in his day natives of Vasconia (Navarre) pronounced B as V and *vice versa* when he wittingly scores the bibulous habits of that people by saying that for them not without reason *vivere* (to live) is *bibere* (to drink): so that one of that nature might say *vivimus ut bibamus*, and the meaning would be either, we live to drink or we drink to live. In the Roman catacombs in sepulchral inscriptions of the 2d and 3d centuries of our era, *vixit* (lived), is in very many instances written *bixit*; and the name of a virgin martyr of that age is written *Bibiana*, and that form is retained in the Roman martyrology instead of the correct form *Viviana*.

B. A. C., the abbreviation used by astronomers in referring to 'The Catalogue of Stars of the British Association for the Advancement of Science,' by Francis Baily, London, 1845.

Baader, *bā'der*, **Benedict Franz, Xaver von**, German philosopher and speculative Roman Catholic theologian: b. Munich, 1765; d. 1841. He studied engineering, became superintendent of mines, and was ennobled for his services. He was deeply interested in the religious speculations of Eckhart, St. Martin, and Bohme, and in 1826 was appointed professor of philosophy and speculative theology in the University of Munich. During the last three years of his life he was interdicted from lecturing on account of his opposition to the interference of the Roman Catholic Church in civil matters.

Baal, *bā'āl*, a Semitic word denoting lord or ruler, and used to designate the Supreme Deity, by the Phœnicians and Chaldeans, and most of the Oriental nations, in the time of the Exodus. Baal seems to have been the sun-deity and was worshipped generally on high eminences, either natural or artificial. Fires were kindled on altars constructed for the purpose, and human sacrifices consumed in them. Baal was the same as Bel or Belus of the Babylonians and Assyrians, whose language was cognate to the Syriac and Phœnician. Collateral with these, may be placed the Osiris and Isis of Egypt, and the Gad and Meni, so frequently mentioned in the Scriptures, whom the Jews worshipped in the days of Jeremiah, having incorporated them into their own cultus from that of the Phœnicians or Carthaginians.

BAAL-ZEBUB — BABBAGE

The Scriptures give us an account of the facility with which the Jews embraced, and the tenacity with which they retained, the worship of Baal, who was identical with Moloch. Manasseh, the 16th king of Judah, set up altars to Baal in groves and high places, prepared for the purpose, and made his children pass through the fire to that god. Israel also was no less involved in this departure from the monotheism of the Mosaic system, to the duo-theism of Chaldaea. In Samaria, the capital of Israel, after the revolt of the 10 tribes, Baal was extensively worshipped, until the time of Jehu, who destroyed the altars of Baal, and tore down the high places of his worship. When the Jews were reproved by the prophet for their idolatry, they insisted that ever since they had left off sacrificing to the queen of heaven, they had been consumed by sword and famine. As early as the times of the Judges, the whole Jewish people served Baal and Ashtoreth, and the vocabulary of Palestine geography attests the domestication of Baal-worship among the inhabitants, in the frequency with which the word Baal appears as a component part of the names of towns and cities, as Baalath, Baalmeon, Baal-peor, and Baal-tamar. Remnants of Baal-worship have descended either through the Jews or the Gentiles even to our own time, and exist to-day in nearly all Christian countries. In Sir John Sinclair's statistical account of Scotland, he describes a ceremony which used to be celebrated in Scotland on 1 May (O. S.), in which the inhabitants of a district, having assembled in a field, dug out a square trench in which they built a fire and baked a cake, and cutting it into as many pieces as there were persons, and blacking one piece over with charcoal, threw them into some convenient receptacle, when each one, blindfolded, drew a piece. He who drew the black piece was sacrificed to Baal, to propitiate his favor for the coming year. The same ceremony was long observed in some parts of Scotland and Ireland, except that the person who drew the black piece was made to leap three times through the flames, instead of being sacrificed, a similar substitution to that instituted by Manasseh, who "made his sons pass through the fire to Moloch." This ceremony is known by the name of Beltane, or Baal-tine.

Baal-zebub, bā-āl'ze-būb. See BEELZEBUB.

Baalbek, bal'bēk, a locality in Syria, in a fertile valley at the foot of Antilibanus, 40 miles from Damascus, famous for its magnificent ruins. Of these, the chief is the temple of the Sun, built either by Antoninus Pius or by Septimius Severus; a rectangular building 290 by 160 feet. Some of the blocks used in its construction are 60 feet long by 12 thick; and its 54 columns, of which 6 are still standing, were 72 feet high and 22 in circumference. Near it is a temple of Jupiter, of smaller size, though still larger than the Parthenon at Athens, and there are other structures of an elaborately ornate type. Originally a centre of the sun-worship, it became a Roman colony under Julius Cæsar, was garrisoned by Augustus, and under Trajan acquired renown as the seat of an oracle. Under Constantine its temples became churches, but after being sacked by the Arabs in 748, and more completely pillaged by Tamerlane in 1401, it sank into hopeless decay. The work of de-

struction was completed by an earthquake in 1759. See Franberger, 'Die Akropolis von Baalbek' (1892); Baedeker, 'Syria and Palestine' (1894).

Baanites, bā-ā-nīts. See PAULICIANS.

Baar, bār, a plateau in Germany, in the province of Baden and Wurtemberg, formerly constituting a county of the Furstenberg principality. It contains the sources of the Danube.

Bab Ballads, *The*, a collection of humorous verses by W. S. Gilbert (q.v.) published in 1868. They form the source of several of the librettos of the Gilbert and Sullivan operas.

Bab-el-Mandeb, bab'el-man'dēb (Arabic, the gate of tears, so called from the danger arising to small vessels from strong currents), the name of the strait between Arabia and the continent of Africa, by which the Red Sea is connected with the Gulf of Aden and the Indian Ocean. The Arabian peninsula here throws out a cape, bearing the same name as the strait, rising to the height of 865 feet. About 20 miles distant stands the wall-like coast of Africa, rising in Rās es Sean to the height of over 400 feet. Within the strait, but nearer to Arabia, lies the bare, rocky Island of Perim, since 1857 occupied by the British as a fort; its guns commanded the entrance to the Red Sea. The strait on the east side of this island is called the Little Strait, and that on the west the Great Strait.

Baba, ba'ba (the old), in Slavonic mythology, a thunder-witch (the devil's grandmother), represented as a little, ugly old woman, with a monstrous nose, long teeth, and disheveled hair, flying through the sky in an iron mortar. By the Czechs she is called now the iron, now the golden, Baba. It is also a Turkish word, signifying father, originating, like our word papa, in the first efforts of children to speak. In Persia and Turkey it is prefixed as a title of honor to the names of ecclesiastics of distinction, especially of such as devote themselves to an ascetic life; it is often affixed in courtesy, also, to the names of other persons, as Ali-Baba. A cape near the northwest point of Asia Minor is known as Baba.

Bāba Būdan, ba'ba boo'dān, a spur of the West Ghāts, Mysore, India, extending east for 15 miles, leaving a narrow opening at its west end for the passage of the Bhadra, and then south in an unbroken line for 20 miles, enclosing between itself and the main chain of the Ghāts a rich, but unhealthy valley. To this spur belong three peaks above 6,000 feet high, among these Mulaina-giri, 6,317 feet, the highest in the West Ghāts. On the slopes of Kalhatti, one of these peaks, is a hill station, a resort of Europeans during the heat. Coffee was first planted in India on another part of this spur toward the close of the 17th century, by a Mohammedan saint named Bāba Būdan.

Bab'bage, Charles, English mathematician and inventor of a calculating machine: b. near Teignmouth, England, 26 Dec. 1792; d. 18 Oct. 1871. He was educated first at the Totnes Grammar School, and Peterhouse College, Cambridge, where he became closely associated with Herschel (afterward Sir John) and Mr. Peacock, then tutor of Trinity College. Being in possession of an independent fortune, Babbage was in a position to devote all his time and

BABBITT — BABCOCK

energies to his favorite studies—mathematics and mechanics. In 1822 we find him broaching the idea of a difference engine, by which intricate arithmetical calculations could be correctly and rapidly performed. Through the recommendation of the Royal Society he received, in 1823, a grant from the government of £1,500 for the construction of such a machine. After a series of experiments lasting eight years, and an expenditure of £17,000 (£4,000 of which was sunk by the originator of the scheme, the balance voted by the government), Babbage abandoned the undertaking in favor of a much more complicated work, an analytical engine, worked with cards like the jacquard loom. The government, alarmed at the probable demands, refused to support Babbage in his new adventure, and as a quarrel ensued with his engineer, who withdrew his tools, the pet project was never completed. The machine, along with some 400 or 500 plans, was presented in 1843 to the King's College Museum, London. Among the many treatises he published on subjects connected with mathematics and mechanics, the most valuable and interesting are: 'On the Economy of Machinery and Manufactures'; 'The Decline of Science'; and an autobiographic sketch, 'Passages in the Life of a Philosopher.' In 1828 he was appointed Lucasian professor of mathematics in his university, an office he held for 11 years. In 1832 and 1834 he stood for Finsbury in the Radical interest, but was unsuccessful. He was one of the founders of the Royal Astronomical Society, and a Fellow of the Royal Society.

Babbitt, Isaac, American inventor: b. Taunton, Mass., 26 July 1799; d. 26 May 1862. He learned the goldsmith's trade; early became interested in the production of alloys; and in 1824 manufactured the first britannia ware in the United States. In 1839, he discovered the well-known anti-friction metal which bears his name, Babbitt metal (q.v.). For this discovery, the Massachusetts Charitable Mechanics' Association awarded him a gold medal in 1841, and subsequently Congress voted him \$20,000.

Babbitt Metal, an alloy of copper, tin and antimony, invented and patented in 1839, by Isaac Babbitt (q.v.) of Boston. It is soft and nearly white, and is widely used as an anti-friction metal. The proportions of the constituent metals vary considerably in modern practice. Babbitt's original alloy contained 24 parts of tin, 4 parts of copper, and 8 parts of antimony. Many engineers prefer a larger proportion of tin, and the following mixture is recommended as giving a tough and very serviceable metal: Tin, 96 parts; copper, 4 parts; antimony, 8 parts. Lead is also added, in many cases, on account of its cheapness. In small amounts it is not usually objectionable, but the Babbitt metal that is sold in the market, ready-mixed, usually contains a considerably larger proportion of lead than its price would indicate. The alloy is usually melted and run, while fluid, directly into the bearings on which it is to be used, a space from an eighth to half an inch thick being left for it between the box and the shaft that is to be supported.

Babcock, Earle Jay, American educator: b. St. Charles, Minn., 11 June 1865. After working extensively with the United States Geological Survey he was appointed in 1902 director of the State School of Mines of North Dakota,

and professor of chemistry and geology in the State University. He is the author of many special scientific articles and of geological reports.

Babcock, James Francis, American chemist: b. Boston, 23 Feb. 1844; d. Dorchester, Mass., 20 July 1897. He studied at Lawrence Scientific School, and became an analytical chemist and chemical expert. He was State assayer and inspector of liquors in Massachusetts, 1875-85, and city inspector of milk in Boston, 1885-89. While state assayer he brought about the insertion in the liquor statutes of the definition of the term "intoxicating liquor," known as the 3-per-cent limit. He is the inventor of the fire extinguisher which bears his name; a popular lecturer on scientific subjects; and has appeared as an expert chemical witness in important trials. He has published several reports on sanitation and the chemistry of food.

Babcock, Maltbie Davenport, American Presbyterian clergyman: b. Syracuse, N. Y., 3 Aug. 1858; d. Naples, Italy, 18 May 1901. He was graduated from Syracuse University in 1879, and Auburn Theological Seminary in 1883. He filled most successful and popular pastorates at Lockport, N. Y., Baltimore, Md., and at the Brick Presbyterian Church in New York. While on a visit to the Levant in 1901 he was seized with the Mediterranean fever and died in the International Hospital at Naples. A posthumous volume of his prose and verse, edited by his wife, appeared in 1901, entitled 'Thoughts for Every-Day Living.'

Babcock, Orville E., American military officer: b. Franklin, Vt., 25 Dec. 1835; d. 2 June 1884. He served with distinction in the Civil War, was a member of Gen. Grant's staff, and was made a brigadier-general of the regular army at the close of the war. When Grant was elected President, Babcock became his private secretary, and the superintending engineer of several important public works. He was indicted in 1876 for taking part in revenue frauds, but on his trial was acquitted.

Babcock, Stephen Moulton, American educator: b. Bridgewater, N. Y., 22 Oct. 1843. He was educated at Tufts College, Cornell University, and at Göttingen, Germany; and was graduated from Tufts College in 1866. He gave special attention to the chemistry of milk and its products, and was the inventor of the Babcock milk-tester. He was instructor of chemistry at Cornell University in 1875-6; professor of agricultural chemistry at the University of Wisconsin; and chemist to the New York State Experimental Station in 1888-1900. He is the author of numerous articles on the composition of milk and butter, and joint author with G. C. Caldwell of 'A Manual of Qualitative Chemical Analysis.'

Babcock, Washington Irving, American shipbuilder: b. Stonington, Ct., 21 Sept. 1858. He was graduated at the Brooklyn Polytechnic Institute in 1876, and at Rensselaer Polytechnic Institute in 1878. He was employed at the Roach Shipyard, Chester, Pa., in 1878-85, and with the Providence and Stonington Steamship Co., New York, in 1885-7; was superintendent of the Union Dry Dock Co., Buffalo, N. Y., in 1887-9; manager of the Chicago Shipbuilding Co., in 1889-99, becoming president of the latter in 1900.

BABEL — BABIRUSSA

Ba'bel, Tower of, the name of a structure in the Plain of Shinar, Mesopotamia. According to the 11th chapter of Genesis, it was begun by the descendants of Noah subsequent to the deluge, but not allowed to proceed to completion. It has commonly been identified with the great temple of Belus or Bel, one of the chief edifices in Babylon, and the huge mound called Birs Nimrud is generally regarded as its site, though another mound, which to this day bears the name of Babil, has been assigned by some as its site. Babel means literally "gate of God." The meaning "confusion" assigned to it in the Bible really belongs to a word of similar form. See **BABYLON**.

Babenberg, bā'bēn-bērg, a princely Franconian family, whose castle occupied the site of the later Bamberg Cathedral. They were most prominent in the wars of the 10th century. The Austrian dynasty of 976-1246 was formerly believed to be sprung from them.

Baber, bā'bēr (or "The Tiger"), the historical surname of Zehir-ed-din-Mohammed, the conqueror of Hindustan and founder of the so-called Mogul dynasty: b. 14 Feb. 1483; d. 26 Dec. 1530. Baber was of mixed Turkish and Mongol origin, but in feeling, as in personal characteristics, he was a Tartar (Turk), and often in his memoirs speaks most contemptuously of Mongols or Moguls. Yet Hindu ignorance has designated the throne which he established in India as that of the Great Mogul. At the age of 12, on his father's death, he ascended the insecure throne of Ferghana in Turkestan; soon after he was attacked on all sides by his uncles and other neighboring princes, which obliged him, in his turn, to assume the aggressive. Accordingly, at the age of 15, Baber seized on Samarcand, the capital of Timour, but, while thus engaged, a revolution at home deprived him of his sovereignty. After many years of an adventurous and romantic career, he raised an army, entered Hindustan, and was met by Ibrahim, the ruling Sultan of that country. The two armies fought the battle of Paniput, which decided the fate of India, on 21 April 1525. Baber, with his army of 12,000 men, completely overthrew that of Ibrahim, numbering 100,000, and entered Delhi in triumph. Difficulties and fresh foes had still to be encountered and mastered, but in the battle of Sakri, in February 1527, Baber utterly defeated the opposing Hindu princes, and then proclaimed himself Padishah, or emperor of Hindustan.

Babeuf, bā-bēf', or **Babœuf**, François Noel, French communist, who called himself Caius Gracchus: b. Saint-Quentin, 1760; d. 28 May 1797. He founded in Paris a journal called the 'Tribune of the People' (1794), in which he advocated his system of communism, known as Babœuvism, and contemplating absolute equality and community of property. His followers were called Babœuvists. Betrayed in a conspiracy against the directory, aiming to put his theories into practice he was guillotined in Paris. His principal works were 'Perpetual Register of the Survey of Lands' (1780), and 'Of the System of Population' (1794). See Advielle, 'Histoire de Babeuf et du Babouvisme' (1884).

Bābi, bā'be, the name of a modern Persian sect, derived from the title, Bāb-ed-Din (gate of the faith), assumed by its founder, Mirza Ali

Mohammed, a native of Shiraz, who, in 1843 undertook to establish a new religion from a mixture of Mohammedan, Christian, Jewish, and Parsee elements. His controversies with the *mollahs* shortly led to his confinement to his own house, where he formulated his doctrines, privately instructed his disciples, and increased his pretensions. The sect soon became numerous; but on the accession of Nasir-ed-Din in 1848, apprehending persecution, they took up arms, proclaiming the advent of the Bāb as universal sovereign. The insurgents were reduced by famine, and most of them executed (1849-50). The Bāb had held aloof from the revolt, but was arrested and put to death, after a long imprisonment, in 1850. His successor was recognized in the youthful son of the governor of Teheran, who retired to Bagdad, where he afterward lived quietly. An attempt of three believers to assassinate the Shah, in 1852, led to a persecution of the sect; numbers were tortured and burned, among them Gurrud-ul-Ain. Bābism is at present widely diffused in Persia; its members live in apparent conformity to orthodox Mohammedanism, but privately holding the Bāb's doctrines, which are contained in an Arabic treatise, 'Biyan' (the exposition), written by the founder himself. They form essentially a system of Pantheism, with Gnostic and Buddhist additions. All beings are emanations from the Deity, by whom they will ultimately be reabsorbed. Bābism enjoins few prayers, and those only on fixed occasions; encourages hospitality and charity; prohibits polygamy, concubinage, and divorce; discourages asceticism and mendicancy; and directs women to discard the veil, and share as equals in the intercourse of social life. See Andreas, 'Die Babis in Persien' (1896); Browne, 'A Traveler's Narrative Written to Illustrate the Episode of the Bāb' (1892).

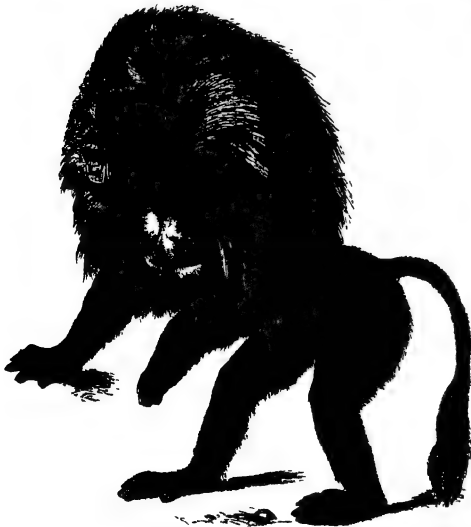
Bab'ington, Anthony, English Roman Catholic gentleman: b. Dettick, Derbyshire, 1561; d. 20 Sept. 1586. He associated with others of his own persuasion to deliver Mary, Queen of Scots, but the plot being discovered, the conspirators were executed.

Bab'ington, Churchill, English philologist: b. Leicestershire, 1821; d. 13 Jan. 1880. He was educated at St. John's College, Cambridge, and was Disney professor of archæology there in 1865-80. He was a voluminous writer on ornithology, botany, archæology, numismatics, etc.; and a contributor to Smith's 'Dictionary of Christian Antiquities.'

Bab'ingtonite, a native, anhydrous silicate of calcium, iron and manganese, associated with an iron silicate having the composition $\text{Fe}_2(\text{SiO}_3)_3$. It is greenish-black in color, with a vitreous lustre, and crystallizes in the triclinic system. It occurs in Norway, Italy, and the British Isles, and in the United States has been found at Gouverneur, N. Y., and perhaps also at Athol, Mass. Its hardness varies from 5.5 to 6, and it has a specific gravity of about 3.36. The mineral was named for Dr. William Babington.

Babirussa, bāb'i-roo'sa, a wild hog of the East Indies, remarkable for the long, exposed, canine teeth of the male. The upper tusks, instead of growing downward in the usual way, turn and grow upward through the skin on each side of the snout and curve backward until, in old animals, they may be 8 or 10 inches long,

BABOONS



1. Bearded Ape (*Cynocephalus silenus*)

4. Hamadryad (*Cynocephalus hamadryas*)

and reach nearly to the eye. These hogs, which inhabit Celebes and Bouru, are almost hairless, long-legged, and active, and feed upon fallen fruits instead of rooting in the ground. One cannot see that the great tusks are of any present use, but Wallace suggests that they were useful to the ancestors of these pigs under different conditions, and were then kept worn down by service.

Babism, bab'izm. See BABI.

Babo, ba'bó, Josef Marius von, German poet: b. Ehrenbreitstein, 14 Jan. 1756; d. 5 Feb. 1822. He was professor of fine arts at Munich in 1778, and of æsthetics at Mannheim, and later became director in the Munich Military Academy, and superintendent of the theatre. He was the author of 'Otto of Wittelsbach,' a tragedy (1781); 'Oda' (1782); 'Dagobert, the Frankish King' (1787); 'The Pulse,' a comedy (1804), etc.

Baboo, bā'boo, or Babu, a Hindu title of respect equivalent to Sir or Mr. It is usually given to wealthy and educated native gentlemen, especially when of the mercantile class.

Baboon, bāb-oon', a large, long-haired, terrestrial monkey of Africa or Arabia, belonging to the genus *Cynocephalus*, of the family *Cercopithecidae*. All are of large size, have elongated, blunt muzzles, with nostrils at the extreme end, and great canine teeth which together give the face, when seen in profile, a dog-like aspect. The naked parts of the face, as well as the great callosities upon the buttocks, are often brilliantly colored. Some also have shaggy manes, and all add to their repulsive appearance a fierceness of disposition which makes them more feared than perhaps is necessary, for they rarely, if ever, have attacked human beings. All of the species go about in troops under the guidance and protection of several old males. They are rare in wooded regions, preferring rocky and bushy districts, like those in northern Africa, in Arabia, and in southeastern Africa. As their fore and hind limbs are of nearly equal length, and very stout, they go mostly on all fours, galloping swiftly and climbing rocks with agility. Their food is principally vegetable — fruits, berries, young sprouts, etc; but they also eat insects, worms, snails, and such young birds or small animals as they are able to catch. They do great damage to the plantations of the native Africans, ruthlessly spoiling much more than they are able to eat. The ancient Egyptians seem to have trained them to pick fruits, but within recent times their confinement in menageries, where they live and breed well, is the extent of their domestication. There is nothing attractive about any of them, either in appearance or disposition.

Among the best known is the great Arabian or sacred baboon, or *hamadryad* (*Cynocephalus hamadryas*), the one represented upon Egyptian monuments, and venerated by the primitive Egyptians. It is supposed that their habits of noisy activity at sunrise, as though adoring the sun-god, is the basis of this very ancient form of worship. Mummies of baboons are commonly found in tombs in the Nile valley; and the species itself is still abundant from the Sudan to southern Arabia. It is ashy gray in color, and has a heavy mane. The great baboon of South Africa, common in the wilder mountains of Cape

Colony, is the chacma (*Cynocephalus porcaurus*), which is dark-brown and has long hair but no mane, and a tail about half the length of the body, terminated by long, black tufts. This is the one most commonly seen in menageries. The mandril (*Cynocephalus mormon*) is still larger, exceeding a mastiff in size. It has short legs, a mere stump of a tail, and an enormous head, with a crest of greenish hair upon the forehead, and a beard which is orange-yellow; while the naked parts of the face consist mainly of a huge nose, light-blue in color, the skin of which is folded into ridges. The naked buttocks are bright scarlet. This ugly brute is one of the most ferocious and justly dreaded animals of the Congo forests. In the same region lives a second similar species called the drill (*Cynocephalus leucophaeus*), which differs mainly in lacking the bright colors and ribs of the nose of the mandril. Several other baboons live in West Africa, but are not well known, although one reddish-brown species, the Guinea baboon (*Cynocephalus sphinx*), is commonly seen in the hands of showmen. A large monkey of southern Abyssinia, looking like a black, clipped French poodle, is substantially a true baboon, although it belongs to another genus; it is the gelada (*Theropithecus gelada*). Consult 'Cassell's Natural History,' Vol. I. (1885).

Ba'brius, a Greek fabulist whose fables in verse are variously referred to the time immediately preceding the Augustan age, and to the 3d century of our era; his name also shows variants, as Babrias, Gabrius. Till 1842 only a few fragments of Babrius were known to be extant; but in that year, in the Laura of Mount Athos was discovered a manuscript containing 123 of his fables. In 1846 Sir George Cornewall Lewis published them together with the pre-existing fragments, and in 1859 or 1860 appeared a good English version by James Davies. The fables have also been edited by W. G. Rutherford (1883) and by Crusius (1897).

Babuyanes, ba'boo-yan'ez, or Madjicosima Islands, a number of islands lying about 30 miles north of Luzon, and generally considered the most northern of the Philippines. The chief islands are Kamiguin, area 54 square miles; Babuyan Claro, 36 square miles; Calayan, 37 square miles; Fuga, 21 square miles; and Dalupiri, 20 square miles. They are subject to the Loo-Choo Islands; aggregate population about 12,000.

Bab'ylans or Babylus, Saint, a bishop of Antioch between 237 and 250. He declined to admit to public worship the Emperor Philip, who had murdered his brother Gordianus in order to gain the throne. In the Roman calendar his day is celebrated on 24 January; in the Greek on 4 September.

Bab'ylon, See BABYLONIA.

Babylon, N. Y., village in Suffolk County, Long Island, 37 miles east of New York; popular as a summer resort on account of its fine beach, and as a rendezvous for sportsmen by reason of its opportunities for fishing. Pop. (1900) 2,157.

Babylonia. Discoveries of the recent decades seem to confirm the idea that Babylonia is the cradle of civilization. The country, which is nearly enclosed by the Tigris and Euphrates from Bagdad to the Persian Gulf, is bounded on the north by Mesopotamia; on the east by the

BABYLONIA

plain of Elam; on the south by the Persian Gulf; and on the west by the Arabian desert. It constitutes the largest portion of the country now known as "Irâq el Arabi." A considerable part of this alluvial plain has been made through deposits by the river. This land-making process continues at the present time at the rate of about 70 feet per year.

At one time the plain was covered with a perfect network of canals which carried agricultural prosperity to every part of the land. The neglect of these has changed the conditions of the country so completely that instead of a fertility which was once the wonder of the ancient world, a cheerless waste now presents itself. Some months of the year the country is partially covered with swamps and marshes, while the remaining portion is a desolate plain.

Here and there throughout the land are to be seen mounds of débris, every one of which covers the remains of a long-forgotten civilization. About the middle of the last century a number of English explorers, Loftus, Layard, and Taylor, visited the ruins of some of the important cities. Through their tentative investigations Nuffar (Nippur or Calneh), Warka (Uruk or Erech), Senkera (Larsa), Muqayyar (Ur), Abu Shahrain (Eridu), besides Babylon, Borsippa, and other cities were located. A few decades later Rassam, also an Englishman, discovered that the ruins known as Abu-Habba represented the ancient Sippara; and decided definitely also that Tell-Ibrahim was Kutha (Cutha). The ancient names of most of these cities were known through the Old Testament.

The first methodical and extensive excavations in the country were begun by the French, under De Sarzec, at Tello (Shir-pur-la), in 1876. These were followed in 1889 by those of the Americans, representing the University of Pennsylvania, under Peters, for about six months, followed by Hilprecht and Haynes. For a few months in 1894 Scheil, a Frenchman, in the interest of the Turkish government, excavated at the ruins of Abu-Habba (Sippara). The Germans under Koldewey and Moritz devoted several months to the exploration of two sites known as El-Hibba and Surghul; but in 1900 Koldewey began systematic excavations among the mounds of ancient Babylon. It is expected that the Germans at Babylon, the French at Tello, and the Americans at Nuffar will continue their operations for many years.

The excavations at Tello and Nuffar have been exceptionally fruitful in important results, especially those conducted at the latter place by the University of Pennsylvania. At Tello were uncovered the remains of an ancient civilization of the 3d and 4th millenniums B.C., representing the Sumerian people. The Nippur excavations yielded antiquities of the Semitic race as well as the Sumerian. At this city the excavators were able to examine the remains of the longest period of occupation known up to the present time. The lowest stratum of débris yielded antiquities which belong to the 7th millennium B.C., while the city continued to be inhabited until about 1000 A.D.

The earliest inhabitants of the country, which was known in the early period as Shumer (Biblical Shinar), are called Sumerians. By the aid of the statues and inscriptions discovered, the physiognomy and customs of this people become comparatively well known. The remains

of their civilization as regards sculpture, engraving, etc., are of an exceptionally highly developed character as revealed by the antiquities, some of which are remarkable for their beauty and the fineness of their execution. They show that the flower of art in this country belongs to about the 4th millennium B.C. Their writing also, instead of being primitive, is so far removed from the original hieroglyphs that in many instances the pictorial outline can no longer be recognized. These things demonstrate the fact that back of that which is now known as the earliest there must be a long period of development covering many centuries.

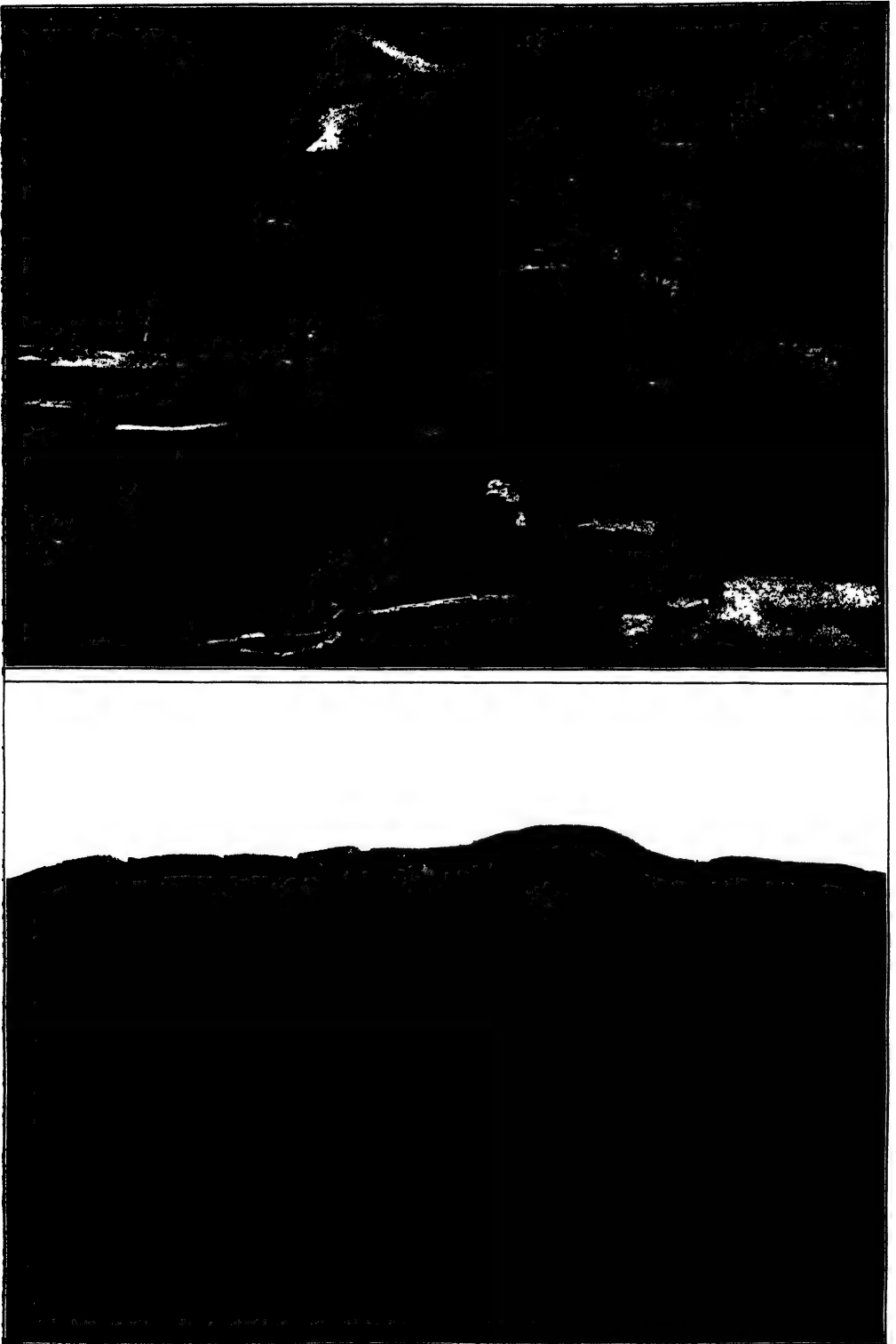
The Sumerians spoke an agglutinative tongue which belongs to that great unclassifiable group of languages known as Turanian. Clay was principally used as their writing material. The impression made by the stylus upon the soft clay has the appearance of a wedge, for which the Latin word *cuneus* is used; hence cuneiform writing. The characters, having ideographic and phonetic values, are made up from one to a dozen or more wedges. There are over 500 characters, some of which have many values. For the different characters and combinations of two or more, about 20,000 values are already known.

It has not been ascertained whence the Sumerians or Semites came. In 4500 B.C. the latter had already entered the land. They gradually conquered their predecessors, the Sumerian people, and adopted their script for their own language. Side by side these two people lived in the country until the amalgamation known to us as Babylonian was more or less complete; at least the Semitic population succeeded in superseding the Sumerian, whose identity seems to be practically lost in the later period. The Sumerian language, however, continued to be used by the Babylonians until the close of their history, especially for official, legal and liturgical purposes.

The number of inscriptions, small and large, discovered in Babylonia up to the present time, number fully 150,000. At Tello, De Sarzec unearthed a library containing about 30,000 tablets belonging to the time of Gudea 3000 B.C. The temple library at Nippur, although only one twelfth part excavated, has yielded to Prof. Hilprecht over 20,000 tablets belonging to the 3d millennium B.C. It contained mathematical, astronomical, medical, historical, linguistic, religious, etc., texts, arranged and classified according to subjects. Besides the clay tablets, cylinders, and prisms, most important documents in stone have been found, which have furnished the data upon which the knowledge of the early period is largely based.

Through other sources, particularly the Babylonian duplicates found in Ashurbanapal's library at Nineveh, considerable is known concerning the literature of this people. Notably might be mentioned the Creation and Nimrod epics, the Deluge story, which greatly resemble the Biblical accounts; Ishtar's descent into Hades; the Etana legend; Adapa and the South Wind, etc. Here properly should be mentioned also the codes of laws upon which the decisions of the kings and judges were made, particularly the code of Hammurabi (Amraphel, Gen. xiv.), discovered by the French, in Susa, under De Morgan. It consists of 282 laws written on a stela which stands over seven feet high. This had been carried away by the old national enemy

BABYLON.



Upper—Excavating the entrance of the Temple of Bêl, at Nippur, 4500 B. C.
Lower—Mounds covering the Temple of Bêl.

BABYLONIA

of Babylonia, the Elamites. Very extensive also is the knowledge of the customs and manners of the people gained through the thousands of contract tablets dated in the reigns of kings of all periods. Practically every kind of legal and domestic contract imaginable, mortgages, deeds of sale, promissory notes, guarantees, etc., the archives of business firms, notably the Egibi House of Babylon, and the Murashu Sons of Nippur have been found. Most valuable for the decipherment of the inscriptions have been the syllabaries, or sign lists, in which the different values of characters are given. Commentaries; lists of gods, names, places, temples, animals, stones, etc.; incantations, hymns, penitential psalms, prayers, etc., are included among the tablets discovered.

The earliest inscriptions reveal a polytheism in a developed state. Most of the gods have Sumerian as well as Semitic names. Until the religion of the Sumerians, or of the Semites, prior to their occupation of this country is known, it will be impossible to ascertain with which people the different gods and religious conceptions originated. The pantheon, which was practically different in every period of Babylonian history, is exceedingly large. Some of the gods mentioned most frequently in the inscriptions are: Anu, Bêl, and Ea, the important triad of the early period; Merodach, Shamash, Sin, Ishtar, Nergal, Nebo, Nusku, Ninib, Gula, etc.

Each city had its temple, which was dedicated to some particular god; for example, Ekur, at Nippur, was sacred to Bêl; Esagil, in Babylon, to Merodach. In addition to the patron deity, shrines to other gods were found in each sanctuary. At Nippur, besides Bêl, 24 other gods were worshipped, for whom shrines were set up within the temple precincts. Through the researches of Prof. Hilprecht in the trenches at Nippur, and in connection with the inscriptions discovered, the real conception of a Babylonian temple and its tower is made known for the first time. The temple had an inner and outer court, both of which were nearly square, the latter being somewhat smaller than the former. The prominent feature of the temple architecture was the *ziggurat*, or storied-tower, which occupied nearly one third of the area of the inner court. In close proximity to the tower stood the temple proper, where the sacrifices were offered. The *ziggurat* consisted of quadrangular platforms, one superimposed upon the other, on the top of which was to be found the shrine. The number of platforms varied according to the period and ability of the builder. In the 3d millennium B.C. the number generally appears to have been three. The *ziggurat* had its origin in the earliest pre-Semitic period, when it was regarded as the tomb of the god. At that time it was the central feature of a fire necropole, or cemetery. The Sumerians cremated their dead. In an early stratum at Nippur one of their crematoriums was found. The remains of the incineration were placed in jars, thousands of which were found buried around the *ziggurat*. It is not known what the Semites did with their dead, but when they became the dominant people of the land the conception of the temple and *ziggurat* seems to have been changed, for thereafter no burials are found within the courts of the temple.

In their cosmology the Semitic Babylonian conception of the earth was a mountain over which the god Bêl ruled. This they believed extended down into Ea's region (subterranean waters), and also that it reached up unto that of Anu (Heaven). They regarded the *ziggurat* as symbolical of the earth, the dominion of Bêl. In their inscriptions, therefore, concerning the building or restorations of these towers, the following expression is repeatedly found: "I laid the foundations of the *ziggurat* in the breast of the earth and built it up that its head was in the heavens" (compare the story of Babel, Gen. xi), thus showing that the *ziggurat* was a representation of Bêl's kingdom, the earth.

In connection with the temple library at Nippur a school or department of instruction was found. Within its rooms were discovered textbooks, and exercises of the students. At Sippara a school similar in character was also found. The complete excavation of all important Babylonian cities will doubtless bring to light a temple, a library, and a school in each.

Recent investigations show that in a general way the Babylonian chronology coincides fairly well with the Hebrew from about the time of Abraham. A great many rulers prior to Hammurabi (Abraham's co-temporary, about 2200 B.C.) are known through their inscriptions. King Nabonidus, the historian and archaeologist (556-538) stated that Naram-Sin had founded the temple of Shamash at Sippara 3,200 years before his time. This in round numbers would make his father, Sargon's date 3800 B.C. Sargon was a powerful ruler; having conquered all the city kingdoms of his land, he extended his conquests as far as the Mediterranean. Many pre-Sargonic rulers are also known, of whom notably may be mentioned Lugalzaggisi, about 4500 B.C., who conquered the ancient world from the Persian Gulf to the shores of the Mediterranean. A number of important rulers of Tello also belonging to this period are known. Between Sargon and Hammurabi several dynasties are more or less completely filled out. Among the important rulers whose names are known should be mentioned Gudea about 3000 B.C., who held sway over the whole of Babylonia; Ur-Gur about 2700 B.C., who erected temples in Ur, Nippur, Erech, and other cities; and also his son Dungi, who extended his rule over parts of Elam and Syria. Hammurabi about 2200 B.C. inherited a throne which was subject to Larsa, but this mighty sovereign overthrew its king and also Elam's, and succeeded not only in uniting the petty principalities under one rule, but he reorganized them in such a way that the kingdom had an uninterrupted history for several centuries. Hammurabi was the sixth king of the first dynasty of Babylon. This was followed by the so-called second dynasty of Babylon; the foreign dynasty of Cassite rulers; 1580-1180 B.C., the dynasty of Pashi 1177-1043, and other rulers. During the period which followed, Babylonia was subject to Assyria until the powerful Neo-Babylonian rule began with the Chaldean Nabopolassar, 626-605, and his son Nebuchadnezzar II. 605-562. These were succeeded by Evil-Merodach, 562-560; Neriglissar, 560-556; Labo-soarchod, 556; and Nabonidus, 555-538. With the overthrow of the latter and his son Belshazzar, the Achæmenian rule began, which continued until the time of Alexander the Great. This

BABYLONIAN EXILE ; BACACAY

great conqueror was followed by the Seleucid and Arsacid kings. Under the Parthians all that remained of Babylonian culture died out, when the knowledge of the language and writing was entirely lost. Jews continued to live on some of the mounds of Babylonia until about 1000 A.D., when finally the country was given up to the Bedouin and the Arab.

BIBLIOGRAPHY. *History*.—Maspero: I. 'The Dawn of Civilization'; II. 'The Struggle of Nations'; III. 'The Passing of the Empires.' Rogers, 'A History of Babylonia and Assyria' (1900). Hommel, 'Geschichte Babylonien und Assyriens' (1888).

Explorations.—Hilprecht, 'Explorations in Bible Lands During the 19th Century' (1903); Kaulenn, 'Assyrien und Babylonien nach den Neuesten Entdeckungen' (1899).

Relation to Old Testament.—'Die Keilinschriften und das Alte Testament' (1902); Price, 'The Monuments and the Old Testament' (1900).

Religion.—Zimmern, 'Die Keilinschriften und das Alte Testament' (1902); Sayce, 'History of the Babylonian and Egyptian Religion' (1902).

Translations.—Schrader (editor), 'Keilinschriftliche Bibliothek,' 6 vols. (1902); Harper (editor), 'Assyrian and Babylonian Literature' (1901). A T. CLAY.

Bab'ylo'nian Exile, or Captivity. It seems to have been part of the statecraft of the ancient Assyrians to remove the people of conquered nations and plant them in unoccupied parts of the dominion, as far distant as possible from the home country of the victims. This custom grew out of civil and geographical conditions. The degree of national intercourse requisite for maintaining a proper ascendancy over the subjugated nation could not be maintained if they were allowed to remain in their own land. Consequently, deportation was necessary—a process which has come to be designated in our language by the word captivity. Anciently, deported nations were not treated with that cruelty we are in the habit of associating with the captive. The captivity of the Jews, who are more especially to be treated in this article, demand the preceding remarks in order to aid in a proper understanding of the frequent notices we find in the Scriptures of the consequence to which these people attained in their foreign residences. There are two Babylonish captivities of the Jews, having their beginnings at different times, although their endings were synchronous. In the civil dissensions following the death of Saul, and culminating at the death of Solomon, the tribes north of the mountains of Ephraim, and those east of Jordan, separated from the rest, leaving Judah and Benjamin in the naturally fortified province of the south. To the north of the revolted tribes lay the kingdom of Syria, then powerful and extensive. Syria had an old feud with Israel, ever since David had made Damascus, the Syrian capital, tributary to himself. Rezon had regained the city under Solomon, but was "an adversary to Israel all the days of Solomon." The attention of Syria was now turned to the defenseless condition of the revolted tribes. They had no longer the fortifications and fastnesses from which David had sallied forth to the northern plains at the foot of the Anti-Lebanon. Judah had,

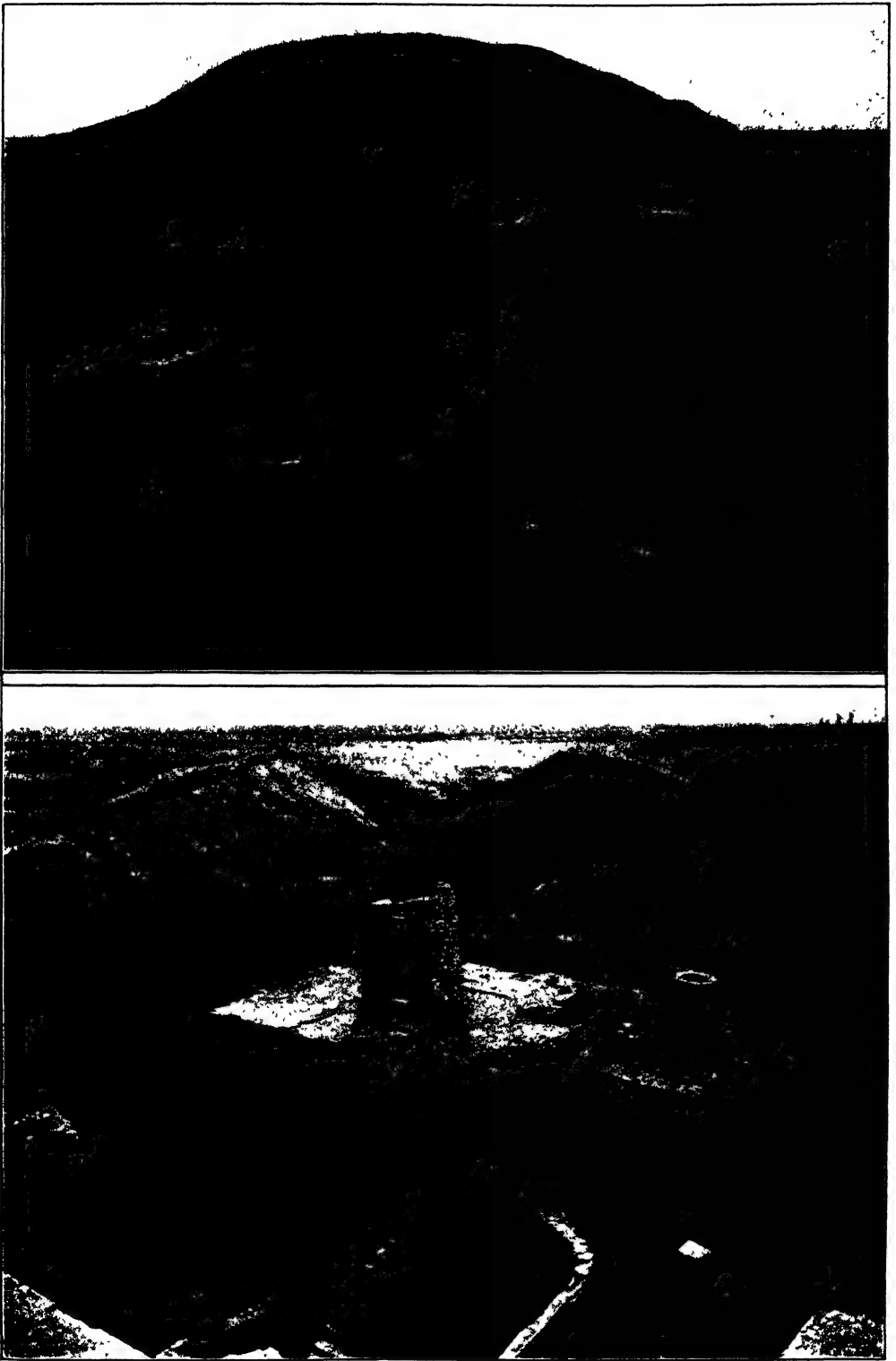
meanwhile, made a treaty, in the reign of Asa her third king, with the Syrian power, who, by his counsel and stratagem, had been induced to break a former league with Israel (1 Kings xv.). Judah also, fearing inroads from the north, had built two new fortifications in the passes of Benjamin (Geba and Mizpeh), and used all her arts to keep herself in favor with Syria, and on the other hand turned her pampered ally against the revolted and unprotected tribes at the north. Israel, tired at length of the continual exposures to Syrian invasion, and exasperated at the immunity and prosperity of the rival Judah, formed a conspiracy with Syria (during the reign of Pekah in Israel and Ahaz in Judah) against her southern antagonist. In the emergency Judah appealed to the Assyrian power, and Tiglath Pileser came against Israel, carried captive a portion of its inhabitants, and then marched upon Syria, slew its king, subdued its capital, and absorbed it into the Assyrian empire, from which it reappears only in the time of Alexander the Great. The successor of Pileser, exasperated by an attempted conspiracy of Hoshea with the king of Egypt, took Samaria, and subdued Israel to a tributary relation, taking away to Babylon the people whom Pileser had left in the first deportation. Thus was accomplished the first captivity of the numerically most powerful branch of the divided house of Israel (721 B.C.). They were first in the subjugation to foreign power from purely geographical considerations. A little more than a hundred years after, Judah, from her mountain fastnesses, followed Israel into the Assyrian empire, in the second great Babylonish captivity. Disregarding some chronological differences, Judah seems to have been progressively carried into captivity, like Israel, by at least two, and perhaps three successive deportations. The first was 598 B.C., and was probably made with the direct object of colonizing the city of Nineveh, which the Assyrian monarch was then endeavoring to restore. The second was in the reign of Zedekiah. Judah had for three successive reigns been heavily tributary to Assyria. Zedekiah rebelled against the tribute, and, like Israel, further exasperated her master by calling upon Egypt in her extremity. In revenge, Nebuchadnezzar burnt the temple and city, put out the eyes of Zedekiah, and led away the people to Babylon, and so ended the Jewish kingdom (588 B.C.), never again to be restored to a national existence; for when, 70 years after the second captivity, the permission to return was given, only a very small part of the Jewish people were in a condition to desire a removal, having become thoroughly naturalized in their foreign dwellings; and even if they had desired it, it would have been only a return to a Medo-Persian satrapy, not to the glory of their ancient kingdom and temple-worship. They remained by the rivers of Babylon and wept. See DANIEL; EZEKIEL; EZRA; JEWS.

The term "Babylonish Captivity" is frequently applied by writers of Church history to the residence of the Popes at Avignon for nearly 70 years.

Bibliography.—Ewald, 'The History of Israel,' translated by Martineau; Piepenbring, 'History of the People of Israel.'

Bacacay, ba-kā'ki, Philippines, a town in the province of Albay, Luzon Island. It is situated on the Gulf of Albay. Pop. 70,550.

BABYLON.



Upper—Excavating around the Ziggurat of the Temple of Bel to virgin soil, 6500 B. C.

Lower—Excavations in the Temple area. Pavement of Ur-Gur, 2700 B. C. Pre-Sargonic strata in the foreground.

BACALAO — BACCHUS

Bacalao, bāk'ka-lā'ō. See **CON**.

Bacara, ba-kar'ra, Philippines, a town of Luzon in the province of Ilocos Norte. Pop. 13,735.

Baccanarists. See **JESUITS**.

Baccarat, ba-ka-ra', a town of France, in the department of Meurthe-et-Moselle, having the most important plate glass works in France. Pop. (1900) 6,772.

Baccarat, a game of Italian origin played with ordinary playing cards; very simple in details and freer from complications than most games at cards. Any number of players may participate, and as many packs of cards may be used as necessary, the number being increased to correspond with the number of players. The member of the party selected to act as banker deals out the cards from a box, after they have been shuffled. The face cards each count 10, and the others according to the numbers of their spots. After the bets have been made, the banker deals two cards to each of the players, including himself, but the other players must receive their cards before the banker is served. The aim of the players is to make the numbers 9, 19, 29, or as nearly those as possible, as 8, 18, and 28. Any player is at liberty either to "stand" or to be "content" with the two cards at first dealt, or to call for more, at the risk of exceeding 29, when his stake is forfeited to the dealer. If, after the first distribution of two cards to each, any player has a "natural,"—that is, a sum making 9, or next in value, 19,—he declares it wins, and the banker pays all who hold superior hands to his own, and claims from those holding inferior hands. The players stake their money separately, there being, in fact, as many separate games in progress as there are players, and the spectators may wager their money on any one of them, all of which must be accepted by the banker. Prior to the banker making a start, he names the amount of the bank. Any one sitting down at the table has the right to call the whole of the bank, selecting the left or the right on which to pick up the cards. Previous to the banker dealing the cards, it is the duty of two croupiers, one on the right and the other on the left, to count up the stakes deposited on either side, and then make up the bank. Thus the banker knows, to the smallest coin, the exact amount of his liabilities.

Bacchanalia, bāk'ka-nā'li-a, feasts in honor of Bacchus, or Dionysos, characterized by licentiousness and revelry, and celebrated in ancient Athens. In the processions were bands of Bacchantes of both sexes, who wandered about rioting and dancing. They were clothed in fawn skins, crowned with ivy, and bore in their hands *thyrsi*, that is, spears entwined with ivy, or having a pine cone stuck on the point. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness till the Senate abolished them, 187 B.C.

Bacchante, bāk-kān'tē, a person taking part in revels in honor of Bacchus.

Bacchiglione, bāk'ke-lyō'ne, a river of northern Italy. It rises in the Alps, passes through the towns of Vicenza and Padua, and enters the Adriatic near Chioggia, after a course of about 90 miles.

Bacchus, bāk'kūs, or **Dionysos**, the god of wine. His history is one of the most perplexing in the Greek mythology. Semele was pregnant with him by Zeus, but became a victim of the craft of Hera. Zeus hastened to save the unborn fruit of his embrace, and concealed it till mature in his own thigh. He afterward committed the infant to Hermes, who carried him to the nymphs of Nysa in India, where he grew and prospered. His teacher was Silenus, afterward his constant companion.

In the vales of Nysa Bacchus invented the preparation of a beverage from grapes, and taught the planting of vines. To spread the knowledge of his invention he traveled over almost the whole known world, and received in every quarter divine honors. Drawn by lions he began his march, which resembled a triumphal pomp, with a great suite of men and women, Sileni, Satyrs, and Mænades. Inspired by the presence of the god, rejoicing, brandishing the *thyrsus*, and crowned with vines and ivy, they danced around him, shouting, "*Evoc! Eleus!*" over hill and valley, accompanied by the tones of Phrygian flutes and timbrels. The Thebans would not acknowledge his divinity, and Pentheus armed himself against him. Bacchus resolved to punish the crime, and inspired the women with a fury which drove them from their dwellings to wander on Mount Cithæron. Pentheus himself was torn in pieces by his own mother and her sisters, to whom he appeared a wild beast. Bacchus punished the daughters of Mynias, who derided his feasts, with frenzy and transformation. At Naxos some Tuscan sailors attempted to carry him off to Italy, supposing him from his purple robe to be the son of a king. They fettered him; but the fetters fell off, vines and ivy entwined the vessel, and kept it fixed in the midst of the sea: the god transformed himself to a lion, and the seamen, seized with madness, leaped into the waves, where they were changed into dolphins. On the other hand, he rewarded such as received him hospitably and rendered him worship, as, for instance, Midas, who restored to him the faithful Silenus.

His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality. To confer the same favor on his mother, Semele, he descended into the realms of Pluto, and conducted her to Olympus, where she was henceforth called Thyone. In the dreadful war with the giants he fought heroically, and saved the gods from impending ruin. During the rejoicing for victory Zeus joyfully cried to him, "*Evan, evoc!*" (Well done, my son!), with which words Bacchus was afterward usually saluted. We find him represented with the round, soft, and graceful form of a maiden rather than with that of a young man. An ornament peculiar to him is the tiara. His long waving hair is gathered behind in a knot, and wreathed with sprigs of ivy and vine leaves. He is usually naked; sometimes he has an ample mantle hung negligently round his shoulders; sometimes a fawn skin hangs across his breast. The earlier bearded Bacchus is properly of Indian or Egyptian origin. His head is sometimes shown with small horns (the symbol of invincible force). In his hand is borne a *thyrsus*, or a drinking cup. The bull, panther, ass, and goat were symbolically associated with this god.

BACCHYLIDES — BACH

The feasts consecrated to Bacchus were termed *Bacchanalia*, *Dionysia*, or in general *Orgia*. They were celebrated with peculiar solemnity in Athens, where the years were universally reckoned by them, and during their continuance the least violence toward a citizen was a capital crime. The great Dionysia were celebrated in spring. The most important part of the celebration was a procession representing the triumph of Bacchus. This was composed of a train of Bacchantes of both sexes, who were masked, clothed in fawn skins, crowned with ivy, and bore in their hands drinking cups and rods entwined with ivy (*thyrsi*). Amidst this mad crowd marched in beautiful order the delegated bodies of the *phratia* (corporations of citizens). They bore upon their heads consecrated baskets, which contained first-fruits of every kind, cakes of different shape, and various mysterious symbols. This procession was usually in the night-time. The day was devoted to spectacles and other recreations. At a very early hour they went to the theatre of Bacchus, where musical or dramatical performances were exhibited. Thespis, known as the inventor of tragedy, is said to have introduced into the Bacchic performance an actor who carried on a dialogue with the *coryphaeus* (leader) regarding the myths narrated of Bacchus or some other divinity. The chorus surrounding its leader, stood on the steps of the altar of Bacchus, while the actor occupied a table. Some regard this as the origin of the stage. The vintage festivals in rural districts were celebrated by Bacchic processions, ruder in form than those of Athens, but characterized by the same wild license and ribaldry. Coarse ridicule of individuals was a marked feature of these occasions.

Bacchylides, bāk-kīl'ī-dēz, Greek poet who flourished about 470 B.C.; a native of Julis, a town on the Island of Cos. He was a cousin of the still more famous lyric poet Simonides, with whom he remained for some time at the court of Hiero in Sicily. He traveled also in the Peloponnesus, and is said to have been a rival of Pindar. Until recently, this poet was known to the modern world only in fragments of beautiful versification. In 1895, however, a well preserved text was discovered and published, and Bacchylides has now taken permanent place as a master of Greek verse. An English translation of the poems appeared in 1897.

Bacciocchi, bā-chōk'kē, **Felice Pasquale**, Corsican captain: b. Corsica, 18 May 1762; d. Bologna, 27 April 1841. In 1797 he married Maria Elisa Bonaparte. In 1805, when Napoleon made his sister Princess of Lucca and Piombino, Bacciocchi was crowned with his wife. After the emperor's fall, he lived quietly and in reduced circumstances at Bologna.

Bacciocchi, Maria Anne Elisa Bonaparte, the eldest sister of Napoleon Bonaparte: b. Ajaccio, Corsica, 1777; d. 7 Aug 1820. She married Felice Bacciocchi, and was created by her brother, in 1805, Princess of Lucca, Piombino, Massa, and Carrara, and in 1809 Grand Duchess of Tuscany. She shared her brother's fall and spent her last years in Austria, dying on her estate near Trieste. Her only son died in 1833, and her only daughter, the Countess Camerata, in 1869.

Bach, bāh, **Alexander von**, Austrian statesman: b. Loosdorf, 4 Jan. 1813; d. 15 Nov. 1892. He was minister of justice in 1848, of the interior in 1849-59; and, subsequently, ambassador to Rome. In 1855, he negotiated the concordat with the papacy which brought Austria into submission to the Roman Church.

Bach, Heinrich, German musician: b. 16 Sept. 1615; d. 10 July 1691. He was the father of Johann Christoph and Johann Michael Bach; organist at Arnstadt.

Bach, Johann Christian, German musician: b. Erfurt, 1640; d. 1682. He was a son of Johannes Bach, the great uncle of Johann Sebastian Bach.

Bach, Johann Christian, German musician: b. Leipsic, 1735; d. 1782. He was a son of Johann Sebastian Bach, and was organist in the Cathedral of Milan 1754-9, and in London, 1759-82, from which residences he was sur-named "the Milanese" and "the English." He composed operas, masses, *Tc Deums*, etc.

Bach, Johann Christoph Friedrich, German musician: b. Leipsic, 1732; d. 1795. He was a son of Johann Sebastian Bach, and was for a long period music master to Count Schaumburg at Buckeburg.

Bach, Johann Michael, German composer and instrument maker: b. 1648; d. 1694. He was a son of Heinrich Bach and the father-in-law of Johann Sebastian Bach.

Bach, Johann Sebastian, one of the world's great composers: b. Eisenach, Saxony, 21 March 1685; d. 28 July 1750. Left an orphan in boyhood he came under the protection of his older brother, Johann Ambrosius, from whom he received his first musical instruction. The death of his brother left Sebastian dependent for support upon his own efforts, and to earn a livelihood he entered the choir of St. Michael's Church in Lüneburg. In 1703 he became court musician at Weimar, the following year organist at Arnstadt, and in 1708 court organist at Weimar. While holding this office he labored to make himself master of every branch of music. In 1717 he was made director of concerts, and six years afterward director of music and cantor to St. Thomas' School, Leipsic, an appointment which he held till his death. About 10 years later the distinctions of kapellmeister to the Duke of Weissenfels and court composer to the King of Poland were conferred upon him. Bach, who had a son in the service of Frederick the Great, received a pressing request to visit Potsdam, on the occasion of a concert there. He went, and acquitted himself to the satisfaction of that monarch, some of whose music he played at first sight. Bach's close studies affected his eyes, and an operation left him totally blind and hastened his death. His best work as composer was done at Leipsic, often in connection with his work at St. Thomas' School. Bach was not only a great composer but a remarkably fine organist, having no rival but Handel among his contemporaries. In composition he naturally owed much to his predecessors, but he surpassed them all, and in many fields of his art was a discoverer. Bach wrote many kinds of music for different instruments, and for the voice, his organ fantasies, fugues and preludes stand pre-eminent among organ pieces; his sacred music, church cantatas, Passion and

BACH — BACHIAN

Christmas music is also of the best, both for its religious spirit and its artistic composition. Only a small portion of Bach's work appeared in print during his lifetime and some of it has been lost. The largest collection of his compositions is that published by the German "Bach-Tesellschaft" in 59 volumes, with supplements.

Bibliography.—Spitta, 'Life of Bach'; and Poole, 'Bach, His Life and Works.'

Bach, Karl Philipp Emanuel, German musician: b. Weimar, 14 March 1714; d. 14 Dec. 1788. He was the son of Johann Sebastian Bach and was court musician in the service of Frederick the Great in 1740-67. He wrote on the theory of piano playing and was a voluminous composer of piano music, oratorios, etc.

Bacharach, bān'a-rah, a town of Germany, situated on the Rhine, 12 miles south of Coblenz. The vicinity produces excellent wine, which was once highly esteemed. The view from the ruins of the castle is one of the sublimest on the Rhine. Pop. (1900) 1,904.

Bache, bāch, Alexander Dallas, American scientist: b. Philadelphia, Pa., 19 July 1806; d. 17 Feb. 1867. He was graduated from the United States Military Academy, at the head of his class, in 1825; became professor of natural philosophy and chemistry at the University of Pennsylvania in 1828; was the organizer and first president of Girard College, 1836, where he established a magnetical and meteorological observatory, and was appointed superintendent of the United States Coast Survey, in 1843. In the last office he performed services of lasting and invaluable character. He was regent of the Smithsonian Institution in 1846-67; an active member of the United States Sanitary Commission during the Civil War; and president of the National Academy of Sciences in 1863. Besides a long series of notable annual reports of the United States Coast Survey, he published a report on 'Education in Europe' (1839), and 'Observations at the Magnetic and Meteorological Observatory at the Girard College' (3 vols. 1840-47).

Bache, Benjamin Franklin, American surgeon: b. 1801; d. 1881. He was great grandson of Benjamin Franklin. He established a laboratory in New York which during the Civil War was of great service to the Federal army.

Bache, Franklin, American chemist: b. Philadelphia, 25 Oct. 1792; d. 19 March 1864. He was appointed professor of chemistry at the Philadelphia College of Pharmacy in 1831, and at the Jefferson Medical College in 1841. He published 'System of Chemistry for Students of Medicine' (1819), and was one of the authors of Wood & Bache's 'Dispensatory of the United States' (1833).

Bache, George M., American naval officer: b. in the District of Columbia, 12 Nov. 1840; d. 11 Feb. 1896. He was graduated at the United States Naval Academy, in 1860, and commanded the ironclad Cincinnati in the various engagements on the Mississippi River, until she was sunk by the Vicksburg batteries, 27 May 1863. He was highly commended by Admiral Porter, Gen. Sherman, and Secretary Welles for his conduct in the last engagement. Subsequently, he took part in both attacks on Fort Fisher, and, in the second one, 15 Jan. 1865;

led the naval assault on the fort. He was retired with the rank of commander, 5 April 1875.

Bache, Hartman, American military engineer: b. Philadelphia, Pa., 3 Sept. 1798; d. 8 Oct. 1872. He entered the United States Topographical Corps; and for 47 years was constantly employed on surveys and on works of hydrographic and civil engineering. On 13 March 1865 was appointed brigadier-general, and 7 March 1867 was retired. His most notable achievements were the building of the Delaware breakwater and the application of iron-screw piles for the foundation of lighthouses upon sandy shoals and coral reefs. He retired from active service, 1867.

Bache, Sarah, American philanthropist: b. Philadelphia, Pa., 11 Sept. 1744; d. 5 Oct. 1808. She was the only daughter of Benjamin Franklin, and the wife of Richard Bache. During the Revolutionary War she organized and became chief of a band of patriotic ladies who made clothing for the soldiers, and in other ways relieved their sufferings, especially during the severe winter of 1780.

Bachelder, Nahum Josiah, American statesman; b. Andover, N. H., 3 Sept. 1854. Educated at Franklin Academy, Taunton Hill School, Andover; and became prominent farmer. Was nominated by the Republicans and elected governor of New Hampshire in 1902.

Bach'eller, Addison Irving, American novelist: b. Pierpont, N. Y., 26 Sept. 1859. He was graduated at St. Lawrence University and became a reporter of the Brooklyn Times. Subsequently he established a newspaper syndicate. His novels are 'The Master of Silence' (1890); 'The Still House of O'Darrow' (1894); 'The Unbidden Guest,' 'Eben Holden' (1900); 'D'ri and I' (1901); and 'Darrel of the Blessed Isles.'

Bach'elor, a term anciently applied to a person in the first or probationary stage of knighthood who had not yet raised his standard in the field. A knight bachelor is one who has been raised to the dignity of a knight without being made a member of any of the orders of chivalry such as the Garter or the Thistle. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college, or university; or a man of any age who has not been married, the most usual meaning of the term. In ancient times unmarried men were subject in some countries to severe penalties for remaining celibates and in modern days the proposition to tax bachelors has been seriously discussed in several nations.

Bach'elor, a local name in the Mississippi valley for the small bass, more usually called crappie (q.v.).

Bachelor's Button, the double yellow buttercup (*Ranunculus acris*). Similar forms, as *R. acutifolius*, are often called white bachelor's buttons. The name is also given to *Centaurea cyanus* (see CORNFLOWER) and to *Gomphrena globosa*.

Bachian, bāch-yān', one of the Molucca Islands, immediately south of the equator, and southwest of Gilolo; area, 800 square miles. It is ruled by a native sultan under the Dutch.

BACHMAN—BACKUS

Bachman, bāk'man, **John**, American clergyman and naturalist: b. Dutchess County, N. Y., 4 Feb. 1790; d. 25 Feb. 1874. He became pastor of a Lutheran church in Charleston, S. C., and published among other works, 'Characteristics of Genera and Species as Applicable to the Doctrine of the Unity of the Human Race' (1854). He is best known by reason of his association with Audubon in the making of the 'Quadrupeds of North America,' he writing the principal part of the text, which Audubon and his sons illustrated.

Bachmut, bāch-moot', a town of southern Russia, in the government of Ekaterinoslav, with a trade in cattle and tallow. It has coal mines and salt wells, and soda is extensively manufactured. The salt produced here is of a very high grade of excellence. Pop. (1897) 19,400.

Bacil'lus. See BACTERIA.

Back, Sir **George**, English explorer: b. Stockport, 6 Nov. 1796; d. London, 23 June 1878. He entered the British navy in 1808, and in 1817 was in the expedition to Spitzbergen. He accompanied Sir John Franklin to the Arctic regions in 1819 and again in 1825, and in 1833 led a party in search of Sir John Ross, then in the Arctic Ocean, and in 1836, in command of the *Terror*, made his last trip to the north. The Geographical Society awarded him a gold medal in 1837, and in 1839 he was knighted. He became admiral in 1867. Among his works are 'A Narrative of the Arctic Land Expedition' (1836); a 'Narrative of the Expedition in Her Majesty's Ship *Terror*' (1838).

Back Bay, a fashionable residential district in Boston, made by filling in an enlargement of the Charles River, formerly called the Back Bay. See BOSTON.

Back Land, name applied to the region around the Arctic Circle, in British North America. It was explored by Capt. Back in 1831.

Back-Staff, an instrument invented by Capt. Davies, about A.D. 1590, for taking the altitude of the sun at sea. It consisted of two concentric arcs and three vanes. The arc of the longer radius was 30°, and that of the shorter one 60°; thus both together constituted 90°. It is now obsolete, being superseded by the quadrant.

Backbite, Sir **Benjamin**, an evil-minded, sharp-tongued character in Sheridan's comedy, 'School for Scandal.'

Backgammon is a game in which two opposing players move symbolic men into or out of each other's territory on a board, according as they are respectively entitled to do so by the throw of a dice. Without question a game of that nature was played among the Aztecs of Mexico centuries before the landing of Cortez, and it is probable that it was brought from Asia to the Pacific coast by the original immigrants. Francisco Lopez de Gomara described it in 1552, and Joan de Torquemada in 1616 gave additional details of the game, mentioning that the little stones of each contestant varied in color. The Iroquois Indians had a dice game of a somewhat similar sort.

Modern backgammon is played by two players who have between them a board, each side of which has alternate black and white angular

marks projecting like rays from the rim. Each player has 15 flat tablets (similar to those with which drafts is played) called men. One player's men are black, the others are white. Each player has a dice box for his own use but the two dice are used alternately by them both. Each dice has a number on each face numbered from one spot to six. Each player throws the dice in turn on to the centre of the board: and moves two men, one man according to the distance indicated by one of the dice and the other according to the number on the second dice. So the game proceeds in the usual manner, the players throwing and moving their men alternately into and out of each other's territory, until one player has carried all the men from the opposite home (or inner table) into the outer table: and thence into his own outer table and finally into his own home or inner table. The simplest text-book on the subject is that of A. Howard Cady.

Backhuysen, bak'hoi-zen, or **Bakhuysen**, **Ludolf**, celebrated painter of the Dutch school, particularly in sea pieces: b. Emden 18 Dec. 1631; d. 1709. His most famous picture is a sea piece which the burgomasters of Amsterdam commissioned him to paint as a present to Louis XVI., and which is still at Paris.

Bäckström, bēk'strēm, **Per Johan Edvard**, Swedish dramatist and lyric poet: b. Stockholm, 27 Oct. 1841; d. 13 Feb. 1886. His principal work is 'Dagvard Frey' (1876), a tragedy; besides this, the dramas 'A Crown' (1869); 'Eva's Sisters' (1869), and 'The Prisoner of Kallö' (1870), met with success. His lyrics were published in three collections (1860, 1870, 1876).

Back'us, **Azil**, first president of Hamilton College, Clinton, N. Y.: b. Norwich, Conn., 13 Oct. 1765; d. 9 Dec. 1817. After graduating at Yale in 1787, he served the Church at Bethlehem, Conn., until he became president of Hamilton College in 1812.

Back'us, **Isaac**, Baptist clergyman and author: b. Norwich, Conn., 9 Jan. 1724; d. 20 Nov. 1806. He was ordained 13 April 1748 and became pastor of a Congregational church in Middleborough, Mass. Some of his congregation sympathizing with the Baptists he united with them and formed a Baptist church in 1756. Throughout his life he was a persistent advocate of the widest religious freedom, holding open communion for many years. For 34 years he was a trustee of the present Brown University, then Rhode Island College. As a delegate to the convention that adopted the Federal constitution, he voted in its favor. Of his numerous writings the most important is 'A History of New England with Special Reference to the Baptists' (3 vols. 1777-96; new ed. by D. Weston, 2 vols. 1871), a partisan but valuable work. His 'History of Middleborough' is in Massachusetts Historical Society Collections (Vol. III., 1st Series, 1794; repr. 1810).

Back'us, **Truman Jay**, American educator: b. Milan, N. Y., 11 Feb. 1842; was graduated at the University of Rochester in 1864; was professor of English literature at Vassar College, 1867-83; then became president of the Packer Collegiate Institute in Brooklyn, N. Y. After going to Brooklyn, he served on

BACON

several state commissions. His publications include 'Great English Writers,' 'Outlines of English Literature,' and a revised edition of Shaw's 'History of English Literature.'

Bacon, Alice Mitchell, American educator: b. New Haven, Conn., 26 Feb. 1858; was educated privately and took the Harvard examinations in 1881; taught at the Hampton Normal and Agricultural Institute in 1883-8, and in Tokio, Japan, in 1888-9; returned to the Hampton Institute in 1889, and founded the Dixie Hospital for training colored nurses in 1890. In 1900 she again began teaching in Tokio. She published 'Japanese Girls and Women,' 'Japanese Interior,' etc.

Bacon, Augustus Octavius, American legislator: b. Bryan County, Ga., 20 Oct. 1839. He was graduated from the University of Georgia in 1859, from the law department of the university in 1860; entered the army of the Confederate States at the beginning of the Civil War, and was adjutant of the 9th Georgia regiment in the Army of Northern Virginia, and later promoted captain and assigned to general staff duty; and in 1866 began the practice of law at Macon, Ga. In 1880 he was president of the State Democratic convention, and in 1884 a delegate from the State at large to the national Democratic convention. He was a member of the Georgia house of representatives in 1871-82, 1892, and 1893, and for the greater part of the time its speaker. Elected to the United States Senate in November 1894, he was re-elected in 1900.

Bacon Benjamin Wisner, American educator: b. Litchfield, Conn., 15 Jan. 1860; studied in Germany and Switzerland, and was graduated at Yale College in 1881; held several Congregational pastorates; and in 1896 became professor of New Testament criticism and exegesis in Yale University. Author of 'Genesis of Genesis'; 'Triple Tradition of the Exodus'; and 'Introduction to the New Testament'.

Bacon, Delia Salter, American author: b. Tallmadge, O., 2 Feb. 1811; d. 2 Sept. 1859. She was eminent in her day as a teacher, and wrote several stories, but is now remembered only as an eloquent advocate of the theory that the plays of Shakespeare were written by Lord Bacon. She herself did not originate the idea, but was the first to give it any currency, in her 'Philosophy of the Plays of Shakespeare Unfolded' (1857). The book had the honor of a preface from the pen of Nathaniel Hawthorne, and the theory has been accepted by a few persons in both England and the United States, who have wasted not a little ingenious reasoning in its advocacy.

Bacon, Edwin Munroe, American author: b. Providence, R. I., 20 Oct. 1844. He received an academical education; was on the staff of several Boston papers; and wrote 'King's Handbook of Boston'; 'Boston Illustrated'; 'Historic Pilgrimages in New England'; 'Literary Pilgrimages in New England'; and 'Boston of To-day.'

Bacon, Francis (VISCOUNT ST. ALBANS), English philosopher: b. 1561; d. 9 April 1626; son of Sir Nicholas Bacon, lord keeper of the Great Seal. He entered Cambridge when in his 13th year, and in his 16th year wrote against the Aristotelian philosophy. It was then the cus-

tom in England to send abroad, particularly to France, those young men who were destined for public life, hence Bacon went to Paris in the suite of Sir Amias Paulet, who soon after sent him to England with an important message. He discharged it to the satisfaction of the queen (Elizabeth), returned to France, and traveled through several provinces of that country to study its manners and laws. The death of his father, in 1579, called him back to England where, in order to be enabled to live suitably to his rank, he devoted himself to jurisprudence, and was so successful in this profession that he was made counsel extraordinary to the queen before he was 28 years old. In 1584 he was sent to Parliament as member for Melcombe Regis, in 1586 he sat for Taunton. About 1591 he became a friend of the Earl of Essex, and when disappointed in not being made attorney-general the latter presented him with an estate in land. Bacon, however, soon forgot his obligations to his generous benefactor, and not only abandoned him, when he fell into disgrace, but even took active part in prosecuting him. Against this ingratitude the public voice was raised, and whatever Bacon might say in his justification, he remained at court the object of hatred to one party and of jealousy to the other, and the queen did not appear inclined to do anything in his favor. In Parliament he conducted himself at first for some time with dignity and independence, and voted with the popular party against the measures of the ministers, though he continued in the service of the Crown. But toward the end of Elizabeth's reign his parliamentary conduct became more servile. For this he may be excused on account of his poverty, which was so great that he was twice arrested for debt. The reign of James I. was more favorable to him. This prince, who was ambitious of being considered a patron of letters, conferred upon him in 1603 the order of knighthood. Having been commissioned to make a representation of the oppressions committed by the royal purveyors in the king's name, he executed the task with so much success as to satisfy both the king and the Parliament. The House of Commons voted him the public thanks, and James made him one of the king's counsel, with a pension of £40, which was soon followed by another of £60. His situation now continually improved; he contracted an advantageous marriage; was made solicitor-general and then attorney-general; in 1617 became lord keeper of the seals; in 1618 was made lord high chancellor and created Baron of Verulam, and in 1621 Viscount St. Albans. He might now have lived with splendor without degrading his character by those acts which have stained his reputation. Nevertheless, great complaints were made against him. He was accused before the House of Lords of having received money for grants of offices and privileges under the seal of state. He was unable to justify himself, and, desiring to avoid the mortification of a trial, confessed his crimes and threw himself on the mercy of the peers, beseeching them to limit his punishment to the loss of the high office which he had dishonored. After he had acknowledged by an explicit confession the truth of almost all the charges, notwithstanding the intercession of the king, and the interest which they themselves took in one of their most distinguished members, the lords sentenced him to pay a fine

BACON

of £40,000, and to be imprisoned in the Tower during the pleasure of the king. He was also declared forever incapable of place or employment, and forbidden to sit in Parliament or to appear within the verge of the court. His sentence was not rigorously executed; he was soon released from the Tower, and the rest of his punishment was by degrees remitted entirely.

All the studies and efforts of this great man aimed at a reform in the system of human knowledge. He examined the whole circle of the sciences, investigated their relations, and attempted to arrange them according to the different faculties of the human mind to which each belongs. In this, however, he could not succeed for want of a well-founded and natural division of the powers of the mind; for he divided the sciences into those of the memory, of the understanding, and of the imagination. This he explains in his 'Instauratio Magna,' under the head *De Dignitate et Augmentis Scientiarum*. He further perceived that, in all the branches of natural science, the only way to truth is by the observation of nature. How this observation is to be directed, and how nature is to be examined, is illustrated in several places. His universal genius had attended to all the sciences; he perceived to what point each of them had advanced, what false directions they had taken, and how they were to be brought back to truth. As a metaphysician he displays no less penetration than profoundness in his views of the operations of the mind, of the association of ideas, and of the prejudices which surround us from our cradle, and prevent the free exercise of reason. As a natural philosopher he brought forward very ingenious views, and was on the route to several important discoveries. He invented a kind of pneumatic machine, by his experiments with which he was led to suspect the elasticity and gravity of the air, which Galileo and Torricelli afterward discovered. He apparently had a glimpse of the law of gravitation, which Newton afterward proved. He wanted only experiments in order to demonstrate the principles of this power. He treated also of natural history, but only in a brief manner, in his work, '*Sylva Sylvarum*,' etc. He wrote treatises dealing with medical subjects; among others, one on life and death. But physiology and chemistry were then so imperfectly understood, that he could not avoid falling into great errors. The science of law he treated not merely as a lawyer, but as a legislator and philosopher. His aphorisms are not less remarkable for profound views than for vigor and precision of expression. Morals are the subject of one of his finest works, entitled '*Essays or Sermones Fideles*'—showing the most profound knowledge of man and of human relations, and written in an eloquent and vigorous style. As an historian he is less distinguished, though his history of Henry VII. possesses solid merits. Of his knowledge of antiquity his work '*On the Wisdom of the Ancients*' bears witness, in which he explains the ancient fables by ingenious allegories. He possessed a less profound knowledge of mathematics, and to this it is to be ascribed that he opposed the Copernican system. In this point alone he remained behind some enlightened men of his time. In other departments of human investigation he soared to such a height, that his contemporaries could not fully estimate the extent of his genius, the justness of his views,

and the importance of his labors. An edition of his works was prepared by Spedding, Ellis, and Heath (1857-74, 14 vols; 7 containing 'Life and Letters' by Spedding); also an edition of selections from his works was published in New York (1877). Dr. E. A. Abbott's 'Francis Bacon' (1885) is a valuable account of his life and works; and Dean Church's 'Life of Bacon' (in the 'Men of Letters' series) is also valuable, more especially as a corrective to Macaulay's misleading essay. A valuable exposition of his philosophy is given in Kuno Fischer's 'Francis Bacon of Verulam' (1857).

Ba'con, Henry, American painter: b. Haverhill, Mass., 1839. He served in the Civil War, studied art in Paris under Cabanel and Edward Frere, and painted, among others, 'Boston Boys and Gen. Gage' (1875); 'Paying the Scot' (1870), and 'The Farewells' (1878).

Ba'con, John, English sculptor: b. Southwark, 24 Nov. 1740; d. 4 Aug. 1799. In early life he was employed in modelling small porcelain ornaments, and while yet an apprentice he formed a project for making statues of artificial stone, which was afterward perfected and carried into effect in a manufactory in the New Road. About 1763 he began to work in marble; and shortly afterward, invented an instrument for transferring the form of the model to the marble. In 1768 he became a student of the Royal Academy, and next year he obtained the first gold medal for sculpture given by that society, the following year he was chosen an associate, and in 1778 was made a full member. His chief works are two groups for the interior of the Royal Academy, the statue of Judge Blackstone for All Souls' College, Oxford; another of Henry VI. for Eton College; the monument of Lord Chatham in Westminster Abbey; and the statues of Dr. Johnson and the philanthropist Howard in St. Paul's Cathedral. **JOHN**, his son: b. 1777; d. 1859; became a distinguished sculptor, and executed various works still to be seen in St. Paul's and Westminster Abbey.

Ba'con, John Edmund, lawyer: b. Edgefield, S. C., 3 March 1832; d. Columbia, S. C., 19 Feb. 1897. Graduated at South Carolina College, 1851; Litchfield (Conn.) Law School, and admitted to the bar, 1854. He was secretary of the United States legation at St. Petersburg, and married a daughter of ex-Gov. Pickens, then minister to Russia. He resigned in 1860, entered the Confederate army, and rose to the rank of major. He was one of the negotiators for the restoration of South Carolina to the Union, 1866; and to him was chiefly due the reopening of South Carolina College by act of the legislature in 1873. In 1886 he was appointed United States chargé d'affaires in Uruguay and Paraguay.

Ba'con, John Mosby, American military officer: b. Kentucky, 17 April 1844; served in the Union army through the Civil War; was appointed captain in the 9th United States Cavalry, in 1866, and colonel of the 8th cavalry in 1897. On 4 May 1898, he was appointed brigadier-general of volunteers and placed in command of the Department of Dakota. In October of that year he put down the outbreak of the Pillager band of the Chippewa Indians in Cass County, Minn. Subsequently, he was assigned to duty in Cuba, with headquarters at Neuvas, till 8 May 1899, when he was retired.



FRANCIS BACON.

BACON

Ba'con, Leonard, American clergyman: b. Detroit, Mich., 19 Feb. 1802; d. 24 Dec. 1881; graduated at Yale in 1820, after which he studied theology at Andover, Mass. In 1825 he became pastor of the First Congregational Church in New Haven, a post which he held officially, though not always actively, until his death. He was professor of didactic theology in Yale (1866-71). He was throughout his life an active opponent of slavery. In 1847 he joined with Drs Storrs and Thompson to found the *New York Independent*, in the joint editorship of which he continued for 16 years. Besides a vast number of reviews and pamphlets, he published 'Views and Reviews' (1840); 'Slavery Discussed in Occasional Essays' (1846); and 'Genesis of the New England Churches.'

Ba'con, Nathaniel, American insurrectionary leader: b. Friston Hall, Suffolk, England, 2 Jan. 1647; d. 26 Oct. 1676. His great-grandfather was cousin to Lord Bacon; his mother, a Brooke, was daughter of a Suffolk knight. He entered St Catherine's College, Cambridge, in 1660; took M.A. 1667; studied law at Gray's Inn, London, and traveled on the Continent. He found life too straitened in England on the income his father allowed him, and the latter gave him £1,800 outright to emigrate to Virginia, where his cousin, Nicholas Bacon, had been living since 1650. He arrived in the latter part of 1673 with a young wife, daughter of Sir Edward Duke, and soon became a member of the governor's council, as was his cousin; and settled on a plantation some 20 miles below Richmond, on the James, called "Curle's Wharf." He also had another on a part of the site of Richmond, the attack on which by the Indians was part of the raid that brought on the imbroglio known as "Bacon's Rebellion," which see for his further career and fate.

Ba'con, Roger, English monk and philosopher. b. near Ilchester, about 1214; d. 1294. He first entered the University of Oxford, and afterward went to that of Paris, where he seems to have distinguished himself much by successful study and teaching, and received the degree of doctor of theology. About 1250 he returned to England, where he entered the order of Franciscans, fixed his abode at Oxford, and devoted himself to his studies, chiefly in natural philosophy. Means were furnished him by generous friends of science, whose contributions enabled him to purchase books, to prepare instruments, and to make the necessary experiments. In examining the secrets of nature he made discoveries and deduced results which appeared so extraordinary to the ignorant, that they were believed to be works of magic. The Franciscan order denounced to the court of Rome his dangerous opinions and astonishing operations, with the result that in 1257 he was sent to Paris, where he was kept in confinement for no less than 10 years. In 1267, Clement demanded a general exposition of his scientific views; upon which Bacon wrote a work under the title of 'Opus Majus,' giving a connected view of the different branches of human knowledge, supplemented soon after by two other works—'Opus Secundum' and 'Opus Tertium' (all of which, as well as certain others of his writings, have been printed). Under Clement's successor, Nicholas III., the general of

the Franciscans, Jerome of Ascoli, declared himself against Bacon, forbade the reading of his writings, and issued an order for his imprisonment, which was confirmed by the Pope. This new confinement lasted 10 years; and when Jerome of Ascoli was elected pope, under the name of Nicholas IV., Bacon vainly endeavored to convince him of the innocence and utility of his labors, by sending him a treatise 'On the Means of Avoiding the Infirmities of Old Age.' After the death of Nicholas IV. he regained his liberty, and returned to Oxford, where he wrote a 'Compendium of Theology.'

Though an extraordinary man, Bacon could not entirely free himself from the prejudices of his time. He believed in the philosopher's stone and in astrology. There are to be found in his writings new and ingenious views on optics; for example, on the refraction of light, on the apparent magnitude of objects, on the magnified appearance of the sun and moon when in the horizon, etc. He describes very exactly the nature and effects of convex and concave lenses, and speaks of their application to the purposes of reading, and of viewing distant objects, both terrestrial and celestial; and it is easy to prove from his writings that he was either the inventor or improver of the telescope. He also gives descriptions of the *camera obscura*, and of the burning-glass. He made, too, several medical discoveries. The discovery of gunpowder has been attributed to him. His writings contain the chemical formula for it, but it is generally supposed that he obtained it from the Arabs, from whose writings he derived other suggestions. He was acquainted with geography and astronomy, discovered the errors of the calendar and their causes, and made a corrected calendar. In moral philosophy also, Bacon laid down some excellent precepts.

Ba'con, Roger, his Opus Majus (1267 A.D.). Newly edited and published, with introduction and full English analysis of the Latin text, by J. H. Bridges (2 vols. 1897). An adequate publication, after 630 years, of one of the most remarkable productions of the human mind.

The work is an exhortation addressed to Pope Clement, urging him to initiate a reform of Christian education, in order to establish the ascendancy of the Roman Catholic Church over all nations and religions of the world. Its central theme was the consolidation of the Roman Catholic faith as the supreme agency for the civilization of mankind. Its author wished to see recognition of "all the sciences," since all are parts of one and the same complete wisdom. He first gave experiment the distinct and supreme place which was later revived by Descartes, and carried out in modern science. He formed a clear conception of chemistry, in his day not yet separated from alchemy; and of a science of living things, as resulting with chemistry from physics. In the part of his work dealing with moral philosophy, Bacon makes the first attempt ever made at the comparative study of the religions of the world. His protests against the intellectual prejudices of the time, his forecasts of an age of industry and invention, the prominence given to experiment, alike as the test of received opinion and the guide to new fields of discovery, render compari-

BACON — BACON'S REBELLION

son with Francis Bacon unavoidable. In wealth of words, in brilliancy of imagination, Francis Bacon was immeasurably his superior. But Roger Bacon had the sounder estimate and the firmer grasp of that combination of deductive with inductive method which marks the scientific discoverer.

Ba'con, Thomas Scott, American theological writer: b. Saratoga, N. Y., 1 Feb. 1825. Originally a lawyer, he became an Episcopal clergyman (1854). Besides sermons, addresses, reviews, etc., he has written 'Both Sides of the Controversy Between the Roman and the Reformed Church' (1858); 'The Reign of God, not the Reign of Law' (1879); 'The Beginnings of Religion' (1887); 'Primitive and Catholic Doctrine as to Holy Scripture'; 'It is Written.'

Ba'con, Philippine Islands, a town in the province of Albay, Island of Luzon. Pop. about 13,000.

Ba'con, the name given the sides of a pig which have been cured or preserved by salting with salt and saltpetre, and afterward drying with or without wood smoke. By the old process of rubbing in the saline mixture, the curing occupied from three to four months. The method now adopted on a larger scale is to place the prepared flitches in a fluid pickle. The pickling, drying, and smoking now occupy not more than six weeks. Bacon may be called the poor as well as the rich man's food. By the former it is prized as a necessary of life; by the latter, for its exquisite flavor. The nitrogenous, or flesh-forming matter in bacon is small, one pound yielding less than one ounce of dry, muscular substance, while the amount of carbon compounds, or heat givers, is large, exceeding 60 per cent. Its digestibility, however, owing to the large proportion of fat it contains, is not less than that of beef or mutton.

Ba'con Bee'tle (*Dermestes lardarius*), an insect, the larva of which destroys bacon, lard, and furs.

Baconian Philos'ophy, the inductive philosophy of which it is sometimes said that Lord Bacon was the founder. This, however, is an exaggerated statement. What Lord Bacon did for this mode of ratiocination was to elucidate and systematize it; to point out its great value, and to bring it prominently before men's notice; lending it the support of his great name at a time when most of his contemporaries were satisfied with the barren logic of the schools. The triumphs of modern science have arisen from a resolute adherence on the part of its votaries to the Baconian method of inquiry.

Ba'con's Rebel'ion, in Virginia, 1676. The English Navigation Acts of 1651 and 1660, restricting colonial trade to English vessels, had produced universal distress in Virginia, forcing it to buy and sell to the home monopolists at their own price; tobacco, not only the chief product, but the chief currency, became almost worthless. In 1667 the smaller landholders were reported on the brink of rebellion, and in 1673 there were meetings to refuse payment of taxes. Meantime the corrupt civil service of the colony, place-hunters sent over by Charles II. to be rid of them, were plundering the planters by means of the export dues, in collusion with the governor, Sir William Berkeley

(q.v.); and the latter was fattening on a fur trade with the Indians. To save himself from the opposition or criticism of the masses, whom he hated and despised, and perpetuate the oligarchy of the small group of rich planters who formed his council, he kept his legislature of 1662,—strongly royalist from the enthusiasm of the Restoration,—in office till 1676 by annual adjournments without new elections; he had also abolished universal suffrage and substituted a property qualification. This built up a strong opposition, including some of the solidest citizens. In 1675 a terrible Indian war broke out, wrapping the frontier in fire and blood; 36 whites were murdered in one day of January 1676. Berkeley, implored to protect the settlements, ordered out a force under Sir Henry Chicheley, then suddenly dissolved it, recalled Chicheley's commission, and refused to do anything more till the Assembly met in March. The result was frightful: within 17 days 60 of the 71 plantations in Rappahannock parish were destroyed, and by the time of the March meeting, over 300 victims had perished, a large part by fiendish tortures. Even then, under Berkeley's orders, the "Long Assembly" (so called in allusion to the Long Parliament) merely committed another outrage: instead of authorizing an army, they authorized frontier forts, to have a garrison of 500 soldiers (from the sea-board counties, not the frontier one which suffered from the Indians, and hated the governor). No attack on the Indians was to be permitted except under specific orders from the governor. Two million pounds of tobacco more were added to their taxes for this mockery of protection, and most of that was embezzled and the forts built so as to be worthless, even for the little service they could do. The people petitioned for leave to form expeditions at their own charge under any leader Berkeley might appoint; he forbade any further petitions of the sort under heavy penalties. It was the universal belief that his one solicitude was to save his Indian trade monopoly from harm. Finally the people of Charles City County petitioned once more for leave, in face of actual ravages then going on; and once more the obstinate and avaricious old man refused it. Men could bear no more; they raised 300 volunteers on their own risk, and by acclamation placed at their head Nathaniel Bacon (q.v.), a planter of 29, recently from England, and one of the governor's council. He accepted it and wrote to Berkeley for a commission; Berkeley returned an evasive answer, and Bacon started on his expedition without it. Berkeley hearing of it, sent an order for the company to disperse; all but a few, however, kept on and dispersed the Indians. Berkeley collected a troop of horsemen, and set out to arrest Bacon, when he heard that the colony was all in revolt behind him; and he hurried back to Jamestown, dissolved his 14-year-old Assembly, and issued writs for a new one. Despite his suffrage restriction, there was a heavy majority against him; Bacon being one of the new members. As the latter approached Jamestown, he was arrested and brought before Berkeley, who, in view of the uprising, did not dare proceed to extremities, but paroled him, and on Bacon's making submission for attacking the Indians without license allowed him to take his seat, with a tacit agreement to give him his commission to finish

BACCOOR—BACTERIA

the Indian war. The new legislature, besides restoring universal suffrage and making other reforms very distasteful to Berkeley, provided for raising an army of 1,000 men for Indian service. But Bacon, still refused the commission, and privately warned that his life was in danger, fled, shortly returned with 600 men, and forced Berkeley to sign his commission as major-general for the Indian campaign, and also a memorial to the king in his favor and reciting the colonial grievances. This later was sent off with a secret note from Berkeley, disavowing it. Bacon within a month had nearly put down the Indian outbreak, especially by a crushing victory at Bloody Run (near Richmond), when he heard that the governor had proclaimed him and his party rebels, and to escape popular wrath had fled across the peninsula to Accomac. Bacon marched back to Middle Plantation (the site of Williamsburg), launched a manifesto against Berkeley, and drew around him a gathering of some prominent men and a vast number of penniless ones (for the movement was largely a democratic revolt against an overweening aristocracy). They agreed to stand by him even against a royal army; feeling that they were compromised beyond retreat at best, and hoping to hold out till the king could be correctly informed and pardon them. Bacon carried on the Indian campaign till September, thoroughly stamping out the danger to the colony; meantime sending an expedition to capture Berkeley, which was itself captured. Berkeley gathered about 1,000 militia by promising them the confiscated estates of the rebels, and reoccupied Jamestown; Bacon marched against him, drove him to Accomac once more, and burnt Jamestown to the ground. But he had taken malaria there, and while invading Gloucester County to attack Major Brent, was stricken down, and died 1 October. The rebellion at once collapsed, and Berkeley wreaked a frightful vengeance upon Bacon's adherents. See *BERKELEY*, SIR WILLIAM. For authorities, besides new documents published in 'Virginia Magazine of History' (1893-8), see the 'Century Magazine,' Vol. XL, under "Nathaniel Bacon," by Edward Eggleston; and John Fiske's "Old Virginia and Her Neighbors," 1897, Vol. II).

Bacoor, ba'kō-ōr', Philippine Islands, a town of the province of Cavite, on the Island of Luzon. Pop. about 14,000.

Bacsanyi, bō'chān-ye, **Janos**, Hungarian poet: b. Tapolcza, 11 May 1763; d. 12 May 1845. His first work, published in 1785, procured him an appointment in a public office, but a liberal poem cost him this in 1793, as well as his liberty the year after. In 1796 he went to Vienna, and there he married a few years later the German poet, Gabrielle Baumgarten—an unhappy match. In 1809, Bacsanyi translated Napoleon's proclamation to the Hungarians, and was afterward obliged to take refuge in Paris. After the Peace of Paris, he lived at Linz, where he died. His collected poems appeared at Budapest in 1827.

Bacteræ'mia, a form of poisoning due to bacterial products. This poisoning is usually due to the absorption of toxins from bacteria situated either on the surface of the body, the intestinal canal, or in some confined space. See *PYÆMIA*.

Bacteria. Literally the word *bacterium*, bacteria being its plural, means a tiny rod or stick. As understood, however, by biologists, bacteria constitute a genus of lowly organized microscopic plants having forms other than that indicated by the literal meaning of the word. Briefly defined, bacteria are unicellular vegetables that multiply by the simple process of transverse division—they are, therefore, schizomycetes. In size they are all of microscopic dimensions requiring in most cases to be magnified from 600 to 1,000 diameters before becoming visible and even then they appear in many instances as scarcely more than tiny points. As encountered in nature they assume a variety of forms which may be conveniently arranged into three principal groups, namely: the spherical, the rod-like, and the spiral. To the spherical forms the name *cocci* or *micrococci* (*coccus*, singular) is given, and, according to the manner in which these tiny spheres develop and their progeny adhere to one another, they are further severally designated as *staphylococci*, that is, cocci clustering irregularly together like grapes in a bunch; *streptococci*, that is, cocci adhering together like beads or pearls in a strand; *diplo-cocci*, that is, cocci occurring in pairs; *tetracocci*, that is, cocci clustered in fours, etc.

To the rod-like group—that is, those which are straight, having one diameter longer than another—the designation *bacilli* (*bacillus*, singular) is given. While the structure and mode of multiplication of many of the bacilli is as simple as is that of the micrococci—that is, one cell divides into two, two into four, and so on *ad infinitum*, without variation, it is nevertheless in the group of bacilli that we encounter a number of species provided by nature with a more highly organized and complicated means for propagation and perpetuation. It is here that we encounter species in the course of whose life cycle there develops within each rod a single tiny, oval, highly resistant body, a spore as it is called, which may be fairly compared to the seeds of higher plants and which, like the seed, may be gathered and kept for almost indefinite periods, without losing their power of germination. Since such spores of bacteria are markedly tenacious of life even under the most unfavorable of circumstances it is obvious that the power to form spores is an important provision for the preservation of the species. It is of passing interest to know that the ability to form spores is possessed by some, but not all, of the disease-producing bacteria, a fact that serves to explain in part the difficulties experienced by the sanitarian in eliminating certain types of infection. For it must be remembered that the infective species capable of entering the spore stage are by virtue of that property much less vulnerable to the action of disinfectants and disinfecting processes than are the species not so endowed.

The spiral forms, *spirilla*, *spirochaeta*, as they are called, comprise those bacteria having one or more curves in their long axis, that is, those that are twisted like a corkscrew. They are sometimes seen as homogeneous, long spiral threads without segmentations, while again they may consist of short curved segments adhering end to end. Spore formation is not a characteristic of the spiral bacteria.

In structure bacteria are non-nucleated masses of protoplasm surrounded by an en-

BACTERIA

veloping zone appearing in some instances to be but a condensation of the central protoplasm, while in others it partakes somewhat of the nature of mucin. Many of the bacteria exhibit no evidence of independent motility, while others, by virtue of special locomotive apparatus (*flagella*) move themselves about in fluids in a most energetic manner. As their structure is exceedingly simple, in so far as formed elements are concerned, their mode of nutrition is, physically speaking, correspondingly simple—that is, the nourishment is absorbed and their waste products discharged directly through their enveloping membranes by the process of osmosis. This being the case it is obvious that bacteria can multiply and perform their physiological functions only under conditions of moisture. Unlike the more highly organized plants bacteria are apparently without special provisions for gaseous exchange, that is, they are devoid of chlorophyl. They obtain their oxygen as such from the free air or from easily decomposable oxygen compounds. In the course of his early investigations in this field Pasteur discovered a group of bacteria that have ever proven to be of the greatest interest—a group that, paradoxical as it may seem, not only does not require free oxygen for its life processes but to the growth of which free oxygen is actually prohibitive. To these species he gave the designation *anaerobic* to distinguish them from the majority, the *aerobic* varieties, to which free oxygen is essential. In their relations to higher life bacteria may be regarded as allies or as enemies, according to the nature of the species under consideration. Contrary to notions that have been more or less prevalent the majority of bacteria have nothing to do with disease production. Their natural role is that of scavengers. They are concerned in nature's great laboratory, the soil, in working over dead organic matters into forms appropriate to the nourishment of growing vegetation. Since in the course of this conversion dead bodies that would otherwise encumber the earth are caused to disappear they must from both the æsthetic and economic standpoints be regarded as, in the main, benefactors. In this group of *saprophytic* bacteria, as they are called, that is, those that live on dead matters, we encounter species of the greatest interest and importance. It is here that we perceive the omnipresent forms concerned in the reduction of dead animal and vegetable tissues into such simple forms as carbon dioxide, ammonia and water to be used by higher plants. It is in this group that we find the ever-present nitrifying species—that is, those peculiar ferments that assist the leguminous plants in assimilating free atmospheric nitrogen; that oxidize the ammonium of decomposition to the nitrous and nitric acids so essential to plant life; that convert the objectionable organic matters of sewage and polluted waters into an inert inorganic form and that, through their specific activities supply, where circumstances are favorable, the entire commercial world with its supply of saltpetre.

The saprophytic group also comprehends many species used in the arts and industries—such, for instance, as those concerned in the production of certain organic acids; those employed in the manufacture of indigo by the fermentation process and in the preparation of hemp; and those utilized in the manufacture of

cheese and butter. In the study of this large group one constantly encounters other species presenting most engaging characteristics—some of these, the *chromogenic* varieties, have the property of producing during the course of their growth pigments of great beauty—brilliant reds, delicate pinks, rich purples, yellows ranging from the palest lemon to the deepest orange, are those most often encountered. In another group, the *photogenic*, we meet with species having the emission of light as their most singular peculiarity. When growing these forms glow with a peculiar phosphorescence, and it is significant to note that these luminous varieties have been most frequently encountered in the sea and upon articles from the sea. The evil odors of putrefaction are the results of saprophytic bacterial development. In the *parasitic* group of bacteria we encounter those species that exist always at the expense of a living host, either animal or vegetable, and in doing so not only appropriate materials necessary to life, but give off in return waste products that may act as direct poisons to the host. Fortunately this is a much smaller group than is the saprophytic mentioned above. In no particulars, save for their ability to exist at the expense of a living host and cause disease, are the disease-producing bacteria distinguishable from the innocent varieties. The essential difference between the disease-producing and the innocent bacterial species is that the former possess as their most striking physiological peculiarity the power of elaborating poisons, *toxins*, technically speaking, that have a direct destructive action upon the tissues of their host. In some cases the poisons may be properly regarded as secretions of the bacteria, and, under artificial conditions of cultivation, may easily be separated from the living bacteria elaborating them. This is especially true of the poisons of diphtheria and of tetanus or lock-jaw. When thus separated such poisons, entirely independent of the living bacteria, retain the specific property of causing the symptoms and many of the pathological changes that characterize the growth of the living bacteria in the tissues. In other cases the poisons cannot be so readily separated; they appear to be an integral constituent of the protoplasm of which the bacteria are composed. This is especially the case with the toxins of *bacillus typhosus*, *bacillus dysenteria*, and *spirillum cholera Asiaticæ*—the organisms concerned in the causation of typhoid fever, epidemic dysentery, and Asiatic cholera, respectively. In the case of still other pathogenic species there is little doubt that specific intoxicants are in one way or another elaborated during infection, but as yet they have not been satisfactorily demonstrated. Nevertheless, it may be said that, in general, infection by bacteria is to-day regarded as essentially a chemical phenomenon—that is, as a reaction between the poisons elaborated by the bacteria and the tissues with which they come in contact; the result of the reaction being the partial or complete death of the host in which the phenomenon is in operation.

Bibliography.—A. Fischer, 'Vorlesungen über Bakterien'; W. Migula, 'System der Bakterien'; Slater and Spitta, 'An Atlas of Bacteriology'; G. Sims Woodhead, M.D., 'Bacteria and Their Products.'

A. C. ABBOTT,
Bacteriologist, University of Pennsylvania.

BACTERICIDE; BACTERIOLOGY

Bactericide, any agent capable of killing bacteria. The older terms, antiseptic, germicide, etc., cover too broad a field, and the word bactericidal has come to mean something more definite and exact than the older terms. Heat is one of the best bactericidal agents. Cold is not bactericidal. Even the lowest temperatures do not destroy the life of these plants. The metallic salts and the phenols are the bactericidal agents most in use. The aldehydes, formaldehyde, benzaldehyde are also efficient. See ANTISEPTIC; GERMICIDES.

Bacteriology. Though generally considered a modern science, and perhaps properly as regards certain of its most important developmental aspects, bacteriology in reality dates from the observations of the Dutch investigator Leeuwenhoek in the latter part of the 17th century. With simple lenses ground by himself, Leeuwenhoek discovered in the mouth, in the excreta, in water, and in other matters examined by him, the presence of countless bodies of smaller dimensions than anything hitherto seen. These "animalcules," as he called them, were often observed to move themselves about in a remarkably energetic manner, and, judging from his text and illustrations, they were doubtless the bodies we now recognize as bacteria. Leeuwenhoek's observations were immediately seized upon by the philosophers of the day as offering an explanation for many hitherto unexplained phenomena. So general became the belief in a causal relation between the "animalcules" and all manner of disease conditions that for a time, we are told, there prevailed almost a "germ mania."

To the investigators of the time the question of greatest fascination in connection with this newly-discovered world was as to its origin. Many believed and stoutly maintained that the "animalcules" were the products of metamorphosis of either living or dead tissues of more highly organized beings; others that they arose *de novo* in "putrescent atmospheres"; many suspected them of spontaneous generation in some other mysterious way; while a few maintained, on experimental evidence, that they were probably the descendants of pre-existing creatures of the same kind. Singular as it may seem it took nearly two centuries to close finally that debate and to prove that the dictum of Harvey "*omne vivum ex ovo*" or better, its appropriate modification "*omne vivum ex vivo*" was as applicable to the microscopic as to the world of higher beings. In its modern aspect bacteriology dates from the epoch-making investigations especially of Koch and of Pasteur conducted during the eighth decade of the 19th century. During that period observations were made and methods of work devised that went far toward starting the subject on its career as a science. In the study of bacteria, as of all other forms of life, it is essential to a correct interpretation of form and physiological function that the observations be made upon isolated species. Prior to the period mentioned this was not possible, for the methods in vogue were insufficient for the separation of these minute creatures from one another. For the development of the science probably the most important step was, therefore, the introduction by Koch of trustworthy methods for the separation of individual bacterial species from mixtures of them, and for the more or less complete determination of their

specific morphological and physiological peculiarities; that is, for the isolation and study of bacteria in "pure cultivation," as it is technically called. Up to the time of Koch's classical research upon the methods of investigating bacteria, their study had been conducted in fluid materials, that is, in infusions of either vegetable or animal matters, in which most bacterial species develop with remarkable activity. Since many totally distinct species are indistinguishable from one another by their size, shape, and general appearance, it was obviously impossible, by the older methods of study, either to be certain if one were dealing with one or more species in the fluids in which they were growing, or to separate the one from the other in case of confusion. Koch appreciated this defect and suggested the use of solid materials as culture media, hoping thereby to reproduce the conditions so often seen when such organic matters as bread, potato, cheese, etc., become moldy on exposure to air. Here one sees the mold not always as an inextricable mixture of different species, but often as sharply isolated islands of beginning growth—as mold colonies—so to speak. These, on examination, are usually found to consist of single species, and on a slice of moistened bread one may often observe several colonies of distinct species growing side by side without, for a time at least, encroaching one upon another. By appropriate methods it is easily possible to transplant such colonies, free from admixture with other forms, and study them as "pure cultures." But such substances as bread, potato, etc., are not in general as well adapted to the study of bacteria as to that of molds. Appreciating this Koch demonstrated that the addition of gelatin to the infusions employed for the successful cultivation of bacteria converted them into practically solid culture media without robbing them of any of their useful properties; and that by the appropriate employment of such solid media it was easily possible to separate as pure cultures the individual species composing the mixtures of bacteria that one desired to analyze. Thus, for example, if a tube of gelatinized beef tea, freed from all living bacteria by heat, be gently warmed until liquefied, and be then inoculated with a mixture of several species of bacteria, growth at once begins, and if left in the test-tube progresses in about the same manner as if the beef tea did not contain gelatin; but if while still warm and fluid the contents of the tube be poured out upon a flat, cold surface, the increased area causes the bacteria to become more widely separated from one another and the lower temperature results in the solidification of the gelatin, so that each bacterium is fixed in its new position. It at once begins to germinate, and presently a "colony" results; the surface ultimately becoming studded with such colonies. As the colonies from the different species differ from one another in many ways—in outline, texture, color, effect of their growth on the gelatin, etc.—it is easily possible, after a little practice to distinguish them by the naked eye, and by transplanting them to tubes of sterile culture media to study them without the disturbing presence of other species; that is, in pure culture.

The introduction of this method for the isolation and study of bacterial species in pure cultivation certainly constitutes the most impor-

BACTERIOLOGY

tant stimulus to the development of modern bacteriology. By its results were placed upon a more secure basis than ever before, and a confidence in the work such as had never existed was awakened in the minds of all students of the subject.

The studies that had been made by Pasteur upon fermentation; upon the souring of wines; upon the maladies of silk worms, and upon certain fatal epizootics of fowls and domestic cattle; together with Koch's fundamental studies upon the infections of wounds and the appropriate methods of analyzing them were rich in suggestion to the pioneers in this new field. Within a comparatively brief period after the adoption of the new methods our knowledge of the exciting causes of many hitherto obscure diseases was greatly extended; it was shown to be possible to determine the modes of their transmission and the channels through which infection occurred. The conditions most favorable to the successful action of a host of substances employed for the purpose of disinfection were accurately determined. And early in the work observations were made that indicated the possibility of successful vaccination against disease through the use of attenuated (weakened) living cultures of specific disease-producing bacteria. One of the most important outgrowths of modern bacteriology has resulted from its application to the problems of the sanitary engineer. As a result of these studies we know that sewage, polluted waters, and polluted soils tend naturally to revert to a state of purity if their pollution be checked and that this progressive purification is due in large part to the activities of the bacteria located within them. It has been found that by the appropriate adjustment of conditions the normal activity of the bacteria may be so greatly accentuated as to constitute them the most important factors in the purification of polluted waters and sewage. The utilization of these facts is conspicuously illustrated in the purification of water by the process of natural sand filtration and in the purification of sewage by irrigation; by the septic tank process, etc. In these methods the living bacteria, and they alone, are the instruments through which the results are attained. The sand grains in the filters and the particles of soil in the irrigation fields serve only as objects to which the bacteria can attach themselves and multiply. By the normal life processes of the bacteria the polluting organic matters in the fluids to be purified are used up and inert matters given off as a result.

In the study of agricultural phenomena from the bacteriological standpoint knowledge has been equally extended. At one time it was taught that atmospheric nitrogen—representing roughly 80 per cent of the air by volume—was of no direct biological significance. This view has in late years been entirely revised. We have learned that the leguminous plants when assisted, symbiotically, by certain soil bacteria, are enabled to make up their nitrogen deficit in large part from the free nitrogen of the air; a fact that sheds important light upon the significance of plants of this type in the practice of "rotation of crops." Under normal conditions instead of impoverishing the soil, the legumens—clover, peas, beans, etc.,—with the aid of the bacteria attached to their roots, may actually enrich it. The application of bacteriological

methods to the study of dairy processes has revealed the interesting fact that the delicate flavors to which butters and cheeses owe their commercial value are directly due to the products of growth of certain species or groups of species of bacteria and more highly organized molds. A number of such species have been isolated and are kept in pure cultivation—so that by purposely inoculating the fresh cream with them butter of uniform flavor may with comparative ease be produced.

Probably the most important results of applied bacteriology are those in connection with preventive medicine. Early in the course of the work it was discovered by Pasteur that certain virulent pathogenic bacteria when kept under particular conditions gradually lost their disease-producing power, wholly or in part, without their other life properties being conspicuously disturbed. If injected into animals when in this attenuated state the result was a mild, temporary, and modified form of infection usually followed by recovery. With recovery the animals so treated were immune from the activities of the fully virulent bacteria of the same species; in other words, they had been protected from the fatal injection by vaccination with an attenuated species. The subsequent developments growing out of this observation have resulted in the annual saving of millions of money through the successful vaccination of sheep, horses, and bovines against the fatal infection known as splenic fever or anthrax, and, though less successfully, of other domestic animals against other infections also. In the closer analysis of the means by which infective bacteria cause disease it soon became evident that it is through the elaboration of specific poisons; sometimes easily separated from the bacteria, at others so intimately associated with the bacterial tissues as to make their separation difficult or impossible. The question arose as to the effect of the poisons, separated from the living bacteria, upon the animals susceptible to infection by the bacteria themselves, and it was found that fatal intoxications often accompanied by the same constitutional symptoms and pathological lesions followed the use of the poisons, just as would follow inoculations with the bacteria by which they were produced. In pursuance of this topic it was discovered that if very small, only mildly intoxicating doses of these specific poisons of bacterial origin were repeatedly injected into susceptible animals that after a while the latter acquired not only a sort of tolerance to them, but a tolerance that was accompanied by the presence in the circulating blood of an antidote for these poisons—an "antitoxin," as it is called. This reaction has been shown to be possible for a number of specific infections, and in the case of diphtheria has met with such practical success as to be deservedly regarded as the triumph of modern medicine.

Bibliography.—Flügge, 'Die Mikroorganismen'; Koch, 'Zur Untersuchung von pathogenen Organismen,' Mittheilungen aus dem Kaiserlichen Gesundheitsamte 1881, Band, I. S. 1; Koch, 'Untersuchungen über die Aetiologie der Wundinfections-Krankheiten'; Löffler, 'Vorlesungen über die geschichtliche Entwicklung der Lehre von den Bakterien'; 'Arcana Naturæ,' detecta ab Antonio van Leeuwenhoek (1695); Mason, 'Water Supply from the Sanitary

BACTERIOLYTIC—BAD LANDS

Standpoint'; 'Purification of Sewage and Water,' Report of the Massachusetts State Board of Health (1890); 'Bacterial Purification of Sewage,' Second Report of the Sewerage Commission of the City of Baltimore (1899); Metchnikoff, 'L'Immunité dans les Maladies Infectieuses' (1901); Park, 'Bacteriology in Medicine and Surgery'; Vallery-Radot, 'Life of Pasteur'; Russell, 'Outlines of Dairy Bacteriology' (1899); Tyndall, 'Essays on the Floating Matter of the Air.'

A. C. ABBOTT,

Bacteriologist, University of Pennsylvania.

Bacteriolytic, an agent capable of destroying bacteria and usually applied to some product of the human body, or of an animal body, notably blood serum, which when injected into an animal is capable of destroying some form of micro-organism in that animal. The production of specific bacteriolytic sera is one of the great advances in modern medicine and its extension promises much hope for the future treatment of many of the bacterial diseases. Bacteriolytic sera have been made for a number of micro-organisms. See IMMUNITY.

Bacterium, a genus of bacteria of the family *Bacillariaceae*, characterized by rod-shaped forms and absence of flagella. They are thus non-motile. A large number of pathogenic bacteria belong to this genus. See BACTERIA; BACILLUS.

Bac'tria. See BACTRIANA

Bactriana, bāk-trī-ā'na, or **Bactria**, a country of the ancient Persian empire, lying north of the Hindu Kush Mountains, on the Upper Oxus. It corresponded pretty nearly with the modern Balkh. Here many scholars locate the original home of the Aryan or Indo-European family of nations. Its capital, Bactra, or Zariaspa, was also the cradle of the Zoroastrian religion. Originally a powerful kingdom, it maintained its independence until its subjugation by Cyrus about 540 B.C., when it became a satrapy of the Persian empire. It was included in the conquests of Alexander, and formed a part of the kingdom of the Seleucidæ until the foundation, about 256 B.C., by Diodotus, of the Greek kingdom of Bactria, which extended to the Indus, and which, after a long struggle, was overthrown by the Parthians. Numerous coins with Greek legends have been found in the *topes* or burial places to the northeast of Kabul.

Bac'trian Cam'el. See CAMEL.

Bac'tris, a genus of American palms, numbering more than 50 species. The genus is of commercial importance, a tough thread used for net weaving, being made from the fibres of *Bactris acanthocarpa*, and walking-sticks are manufactured from the long slender stems of *Bactris maraya*. The fruit of the latter is considered a delicacy.

Bactrites, bāk-trī'tēz, a genus of fossil ammonites, with a straight shell, and indented, but not ramified septa. The genus ranges from the lower Silurian to the Devonian.

Bac'trus, the ancient name of a river in the province of Balkh, central Asia, upon which Bactria was situated.

Baculites, bāk'ū-lī'tēz, a genus of fossil ammonites, characteristic of chalk formations, having a straight, tapering shell.

Bacup, bāk'ūp, England, a town of Lancashire, 18 miles north from Manchester. There are a number of churches, chapels, and schools, a mechanics' institute, court-house, market-hall, large co-operative stores, etc. The chief manufacturing establishments are connected with cotton spinning, and power-loom weaving; there are also iron and brass foundries and machine-shops, dye-works, etc., and in the neighborhood coal-pits and vast stone quarries. Its charter of incorporation was granted in 1882. Pop. (1901) 22,505.

Baczko, bāts'kō, **Ludwig von**, German historian and scholar: b. Lick, Prussia, 8 June 1756; d. 27 March 1823; was educated at Königsberg, studying philosophy, medicine, and law, but became blind in 1777, through an attack of small-pox. In 1816, he was appointed director of the Institute for the Blind at Königsberg. He is the author of 'A History of Prussia,' a 'History of the French Revolution,' and 'Concerning Myself and My Companions in Misfortune, the Blind' (1807).

Bad Lands, a name applied to the arid regions of the west, where are districts presenting wide areas of hills and ridges of moderate height, bare of sod and intricately broken by numerous gullies and ravines. The principal areas are in the western Dakotas and central Wyoming, and smaller examples of bad-land topography are of frequent occurrence in the arid regions in various portions of the world. In the Big Bad Lands of western South Dakota, east of the Black Hills, there is an area of about 2,000 square miles, which consists largely of bad lands occupying extensive basins cut in a plateau along the White and Cheyenne rivers. They present wonderfully weird scenery, but are rarely visited by the average sight-seer. An extensive area in the valley of the Little Missouri River is crossed by the Northern P. R.R. in the vicinity of Medora, and many bad-land features are visible near the railroad. Typical bad lands present ridges and mesas from 200 to 400 feet high in greater part, eroded into fantastic shapes and cut by ravines and gullies into an endless variety of rugged buttresses and pinnacles. The materials are mainly light-colored, sandy clays, and soft sandstones in nearly horizontal strata, and their bare slopes are dazzling in the bright sunlight. Most bad land regions were table-lands originally, and areas of the old surface remain in level-topped, grass-covered mesas of various sizes, with bad land slopes extending to flat-bottomed valleys of greater or less width. Bad lands exhibit clearly the close relations of topographic form to rock texture, the homogeneous clays being carved into regular slopes, in which sandstone layers give rise to benches, or protect columns and pinnacles of clay. Bad lands are developed in soft rocks where a region has been so uplifted that there is rapid erosion, under arid or semi-arid climatic conditions. The occasional rains cut gullies which eventually are deepened into ravines, and, as the rocks are soft, the erosion progresses more rapidly than vegetation can establish itself. In regions of abundant rainfall, vegetation is so vigorous that it usually forms a protective mantle on all but the steeper slopes, but in arid lands, a thin sod is the principal growth, and it is quickly removed by the rapid run-off of the torrential rains. The Big Bad

BADAGRI — BADEN

Lands of South Dakota have yielded large numbers of fossil animals of late Eocene age, which have made the region famous as a collecting ground.

N. H. DARTON,
U. S. Geological Survey.

Badagri, ba'da-grē, or **Badagry**, a British seaport on the Bight of Benin, in the extreme southwest corner of the British Niger Territory, Africa. Early in its history it was a noted slave mart; contained important manufactories; and had a population of 10,000. It was from this place that, in 1825, Clapperton and Lander started to explore the African interior.

Badajoz, ba'da-hōth', the capital of the Spanish province of Badajoz, on the left bank of the Guadiana, which is crossed by a stone bridge of 28 arches. It is a bishop's see, and has an interesting cathedral. During the Peninsular war, Badajoz was besieged by Marshal Soult, and taken in March 1811. It was twice attempted by the English, on 5 and 29 May 1811; was besieged by Wellington on 16 March, and taken 6 April 1812. Pop. 22,860.

Badakhshan, ba'dakh-shan', a territory of central Asia, tributary to the ameer of Afghanistan. It has the Oxus on the north and the Hindu Kush on the south; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. 100,000.

Badalona, ba'da-lō'na, a seaport of Spain, on the Mediterranean, five miles from Barcelona. Pop. 19,200.

Baddeck', a fishing village and summer resort on Cape Breton Island.

Bad'derlocks (*alaria esculenta*), an olive-colored sea weed which grows on rocks in deep water on the shores of Europe and Iceland. It has a short cylindrical stem with lateral spore-bearing process, and a membranous olive-green frond of 2 to 12 feet long, with a stout midrib. This midrib, together with the fruits, is eaten by the inhabitants of the sea coasts of Iceland, Denmark, Scotland, Ireland, etc., and is said to be the best of the esculent algae. The name is supposed to be a corruption of balder-locks.

Badeau, ba-dō', **Adam**, American military officer: b. New York, 29 Dec. 1831; d. 19 March 1895; was educated at private schools. He served with gallantry in the Union army during the Civil War; was on the staff of Gen. Sherman in 1862-3, and secretary to Gen. Grant in 1864-9; and in the latter year was retired with the rank of captain in the regular army and of brevet brigadier-general of volunteers, and was appointed secretary of legation in London. He was consul-general in London, 1870-81, and during this period was given leave of absence to accompany Gen. Grant on his tour around the world (1877-8). In 1882-4 he was consul-general in Havana. After the death of Gen. Grant he brought suit against his heirs for payment of services which he asserted had been rendered in the preparation of Gen. Grant's 'Memoirs,' but lost his case. His publications include: 'The Vagabond' (New York 1889); 'Military History of Ulysses S. Grant' (3 vols. 1867-81); 'Conspiracy; A Cuban Romance' (1885); 'Aristocracy in England' (1886); and 'Grant in Peace' (1886).

Baden, bā'dēn, a grand duchy in the German empire. The Rhine separates it from Al-

sace on the east, and Wurtemberg bounds it on the west. It has an area of 5,823 square miles, with a population of 1,866,584 in 1900, an increase of 121,120 over the census of 1895, or a gain of 1.58 + per cent each year. The country is mountainous, being traversed by the lofty plateau of the Schwarzwald, or Black Forest, which attains its highest point in the Feldberg (4,904 feet). The nucleus of this plateau consists of gneiss and granite. In the north it sinks down toward the Odenwald, which is, however, of different geological structure, being composed for the most part of red sandstone. The whole of Baden, except a small portion in the south-east, in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the south and west. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and include a considerable part of the lake of Constance. The climate varies much. The hilly parts, especially in the east, are cold and have a long winter, while the valley of the Rhine enjoys the finest climate of Germany. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits, also. Of the total area, 42 per cent is under cultivation, 37 per cent under forest, and 17 per cent under meadows and pastures. The farms are mostly quite small. The manufactures are important. Among them are textiles, tobacco, and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes, and other musical toys. The capital is Carlsruhe, about five miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Baden, and Heidelberg. Baden has warm mineral springs, which were known and used in the time of the Romans. Heidelberg has a university (Protestant), founded in 1386, the oldest in the present German empire. The railways have a length of 850 miles, and are nearly all state property.

In the time of the Roman empire, southern Baden belonged to the Roman province of Rhætia. Under the old German empire it was a margravate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of grand duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power is vested in the grand duke, the legislative in a house of legislature, consisting of an upper and a lower chamber. The former consists partly of hereditary members; the later consists of elected representatives of the people. The revenue is mainly derived from taxes on land and incomes, and the produce of crown-lands, forests, and mines. The revenue in 1901 was \$37,723,000. Baden sends three members to the German Bundesrath, or Federal Council, and 14 deputies to the Reichstag. Two thirds of the population are Roman Catholics, the rest Protestants.

BADLANDS.



Typical views in Big Badlands of South Dakota, showing pinnacles of hard clay capped by sandstone, the sodless slopes, and in the distance a remnant of the original plateau out of which the Badlands are eroded.

BADEN — BADGER

Ba'den, a town in Switzerland, canton Aargau. The town (*Ober-Baden*, or *Baden-im-Aargau*) is 12 miles northeast of Aarau, on the left bank of the Limmat. It has a town-hall, a handsome Roman Catholic church, a convent, monastery, hospital, etc., and is celebrated for its hot sulphurous baths, which are employed in gout, rheumatism, and cutaneous diseases. The hottest springs have a temperature of 116° F. The Romans were well acquainted with the baths here; and between the 15th and 18th centuries they were the most celebrated in Europe. Pop. (1900) 6,100.

Bad'en-Ba'den (anciently, *Civitas Aurelia Aquensis*), a town and watering-place in the grand-duchy of Baden, 18 miles south-southwest of Carlsruhe. The older part of the town is built on a spur of the Black Forest, overhanging the valley of the little stream Oosbach. The houses here are in general old and high; the streets mostly narrow and crooked, and nearly all steep. The new and larger portion of the town lies below, and is rich in fine hotels, elegant villas, and handsome private dwellings. The edifices most deserving of notice are the New Palace, standing on an isolated height above the town, and surrounded by fine gardens; the town or parish church, containing the tombs of 14 margraves of Baden; the Protestant church, the English church, and the new town-hall. Baden has been celebrated from remote antiquity for its thermal baths, which made it a favorite resort of the Romans. The season lasts from 1 May to 31 October, and 60,000 visitors arrive annually. Pop. (1900) 15,700.

Baden-Powell, bā'dēn-pow'ī, **Sir George Smyth**, English politician and political writer. b. Oxford, 24 Dec 1847; d. 20 Nov. 1898. He became a member of various important commissions, among others that on United States and Canadian fisheries (1886-87); the new Malta Constitution (1887); the Bering Sea inquiry (1891); the Joint High Commission (Washington, 1892); and the Paris Arbitration (1893). He was author of 'New Homes for the Old Country' (1872), a storehouse of information about Australia; 'Protection and Bad Times' (1879); 'State Aid and State Interference' (1882); 'The Truth About Home Rule' (1888); 'The Land Systems of India' (1892); etc. He was a member of Parliament from Liverpool from 1885 till his death.

Ba'den-Pow'ell, **Robert Stevenson Smyth**, British military officer; b. London, 22 Feb. 1857; was educated at the Charterhouse School; joined the 13th Hussars in 1876; was adjutant in India, Afghanistan, and South Africa; Assistant Military Secretary on the staff in South Africa in 1887-9; took part in the operations in Zululand, for which he was highly commended, in 1888; assistant military secretary in Malta in 1890-3; on special service in Ashanti, commanding the native levies, 1895, for which he was brevetted lieutenant-colonel; chief staff officer in the Matabeleland campaign, for which he was brevetted colonel, and became lieutenant-colonel, commanding the 5th Dragoon Guards, in 1897. In the war in South Africa in 1899-1900, he signally distinguished himself by his grand defense of Mafeking, Cape Colony, holding the town with a small force against repeated attacks, under an almost continuous bombardment, from 15 Oct. 1899, to 16 May 1900. Three

relief columns were started, the last only being successful. In recognition of this heroic defense, the queen promoted Baden-Powell to be a major-general. Gen Baden-Powell has published several works, including 'Reconnaissance and Scouting' (1890); 'Vedette' (1890); 'Cavalry Instruction' (1895); 'The Downfall of Prempeh' (1896); 'The Matabele Campaign' (1896), etc.

Baden-bei-Wien, bā'dēn-bī-vēn, a watering place of lower Austria, about 15 miles south-southwest of Vienna. It was the *Aquæ Pan-noniæ*, or *Cethiæ* of the Romans, and is still famous for its warm mineral springs, which are frequented during the season by from 12,000 to 15,000 persons, chiefly from the Austrian capital. Season from July to September. Pop. (1900) 17,700.

Badeni, bā'dēn-ē, **Count Cassimir Felix**, Austrian statesman; b. Poland, 14 Oct. 1846. His father, though poor, was a man of intellect, and was made a count by the king of Poland just before the birth of Cassimir. He also fell heir to a fortune, and his two sons received a university education. Cassimir entered the Austrian civil service; became district chief at Zolkiew in 1871; minister of the interior in 1873; governor of Galicia in 1888; and prime minister of Austria-Hungary, 15 Sept. 1895. In April 1897, because of inability to maintain a Liberal majority in the newly elected Reichsrath, he resigned with his cabinet, but the emperor declined to accept his resignation, and he remained in office until 28 November, when he again resigned and a new cabinet was organized. The principal feature of his administration and the one which not only caused his fall, but a long period of political agitation, was his introduction of what is known as the "language ordinance," which allowed the official use of the Czech language in Bohemia and Moravia. This measure alienated the Germans and provoked a racial conflict of a most bitter character between them and the Czechs.

Badenweiler, bā'dēn-vī-lēr, a watering place in the grand duchy of Baden, near Mullheim. Its mineral springs are now rated among the indifferent waters, and it is of interest chiefly for the ruins of Roman baths that were discovered in 1847. The foundation of the town is referred to the time of Hadrian, and the remains of the vapor baths, of which there are excellent specimens, are supposed to be of the same period. The ruins show a division for men and for women, each having a large outer court opening into a dressing-room; there is the hot-air bath, the warm bath, and the cold bath. The walls and steps are in their original position. The whole structure is 318 feet by 90 feet.

Badge, a distinctive device, emblem, mark, honorary decoration, or special cognizance, used originally to identify a knight or distinguish his followers, now worn as a sign of office or licensed employment, as a token of membership in some society, or generally as a mark showing the relation of the wearer to any person, occupation, or order.

Badg'er, **George Edmund**, American statesman; b. Newbern, N. C., 13 April 1795; d. 13 April 1866; was graduated at Yale College in 1813; became a lawyer at Raleigh; and was judge of the North Carolina Superior court

BADGER—BADGLEY

in 1820-5. He was appointed secretary of the navy, 14 March 1841, resigning after the death of President Harrison, and was elected to the United States Senate in 1846 and 1848. In 1853 he was nominated for justice of the United States supreme court, but was not confirmed. He served in the State convention called to pass on the question of secession, although opposed to such measure, and after making a strong speech in defense of the Union, was afterward known as a member of the Conservative party.

Badger, Joseph, American clergyman, one of the earliest missionaries to the country northwest of the Ohio River: b. Wilbraham, Mass., 28 Feb. 1757; d. 5 May 1846. He received his early instruction chiefly from his parents, and at the age of 18 joined the Revolutionary army. He remained in service for four years, then determined to obtain an education and engage in the Christian ministry. Entered Yale College in 1781, where he maintained himself and his scholarship by alternately studying and teaching. He remained a few years in Connecticut, then in 1800 was selected by the missionary society of that State to visit the unsettled parts of Ohio. His work took him from settlement to settlement, often more than a day's journey apart, through a country where there were no roads, and across rivers without bridges. During the War of 1812 he was appointed by Gen. Harrison chaplain to the army in that district, and his knowledge of the country was of great service to that commander-in-chief; but he resumed his missionary functions at the close of the war and continued them till 1835, when he retired and lived with his only daughter. During the latter years of his life he received a pension from the United States.

Badger, Oscar L., American naval officer: b. Windham, Conn., 12 Aug. 1823; d. 20 June 1899; entered the United States navy, 9 Sept. 1841; became lieutenant-commander, 16 July 1862; commander, 25 July 1866, captain, 25 Nov. 1872; commodore, 15 Nov. 1881; and was retired 12 Aug. 1885. He served on the steamer Mississippi during the Mexican war, taking part in the attack on Alvarado, 1846; led the party that attacked and destroyed the village of Vutua, Fiji Islands, while on the sloop John Adams, 1855-6; and in the Civil War commanded the Anacostia, of the Potomac flotilla, 1861-2, and the ironclads Patapsco and Montauk, in the operations in Charleston harbor in 1863; and was acting fleet captain on the flagship Weehawken in the attack on Fort Sumter, 1 Sept. 1863.

Badger, a stout, burrowing, carnivorous mammal of the fur-bearing family *Mustelidae*, related to the skunks and weasels, species of which inhabit various parts of the northern hemisphere. Badgers have short legs, elongated feet with powerful toes adapted to digging, heavy jaws with big teeth, and great strength, courage, and cunning. They wear coats of thick fur usually grizzled in brown and gray, the face is striped and the paws are blackish. The fur is of considerable value. The American badger (*Taxidea americana*) was formerly distributed all over the western part of the United States from the prairie districts of Ohio and Wisconsin to the Pacific coast, but has been exterminated by civilization east of

the dry plains, where it is still numerous although not often seen, because it rarely comes abroad except in the night. It dwells in deep burrows which it digs for itself and feeds upon gophers, ground-squirrels, such ground-building birds and their eggs and young as it is able to catch, and, in times of scarcity, upon small reptiles and insects. Badgers abound in the vicinity of prairie-dog towns, whose underground homes they can enter or dig out without difficulty. This species is found as far north as Hudson Bay and south to central Mexico, where the local variety is called "tejon." When by rare chance a badger is surprised during the day too far away from his hole to escape into it before being observed, he squats down, withdrawing nose and feet beneath his body, and remains absolutely still, when his grizzled back looks so much like a mere hillock of earth that he is likely to escape being seen altogether. The extraordinary breadth and fatness of his form is one of his strongest characteristics. During the coldest part of the winter he retires to his den and passes the time when no food is to be had in deep sleep. The best account of this animal is to be found in Dr. Coues's 'Furbearing Animals' (Washington 1877). Consult also Ernest Ingersoll's 'Wild Neighbors' (New York 1897). The European badger (*Meles taxus*) is very similar in general appearance but differs in anatomical details. Its general habits and food are like those of the American badger except that in the absence of open plains it dwells in wooded regions and has a fondness for honey, digging it out of the nests of bumblebees and others which make their homes in the ground. This is the animal formerly used in the cruel sport of badger-baiting. A captive badger was placed in an overturned barrel or some similar place, and dogs were set upon it for the amusement of seeing the fighting that resulted. It required a powerful and active dog to overcome the little animal. Frequently, however, the badger was given no fair chance, but was compelled to face in the open two or three dogs. From this unmanly sport is derived the verb "to badger." Many references are to be found in early English literature to this amusement, and to the animal itself under the old terms "grey" and "brock," the latter still in common use in northern England and Scotland. Various closely related species and varieties of the badger are to be found in northern Asia, and other relatives exist in India, Malay Islands, and Africa. For these see SAND-BADGER; HONEY BADGER; RATEL; TELEDU; ZORILLA.

Badger State, a nickname given to the State of Wisconsin.

Badghis, bad-gêz', a region north of Herat, comprising the country between the Murghab and the Harirud rivers, as far north as the edge of the desert. It lies just to the south of the boundary line between Afghanistan and the Russian territories, as defined in 1887.

Badgley, Sidney Rose, Canadian architect: b. near Kingston, Ont., 28 May 1850. He studied architecture in Toronto, and, after practising some time in St. Catharines, established himself in Cleveland, O. He has made a specialty of the architecture of churches and public buildings, and has planned and erected churches

in almost all parts of Canada and the United States, and, among other structures, the Massey Music Hall, Toronto; the Slocum Library and Perkins Observatory, in Ohio; Wesleyan University, in Delaware, and the Medical College, Cleveland. He published an 'Architectural Souvenir' (1896).

Badham, bād'ām, **Charles**, English educator: b. Ludlow, 18 July 1813, d. 26 Feb. 1884; was considered one of the most eminent classical scholars of his day; and after serving for several years as head master of King Edward VI.'s Grammar School at Louth, he became professor of classics and logic in the University of Sydney, Australia, 1867. While in Sydney he established a system of teaching by correspondence, similar to the present university extension scheme. He published a number of works on Greek classics, and 'Criticism Applied to Shakespeare' (1846).

Badia y Leblich, ba-dē'a e lā-blēch', **Domingo**, Spanish traveler b 1766, d 1818; he visited in 1803 and the four following years the Mohammedan countries bordering on the Mediterranean. During the whole of his tour he professed to be a Mussulman, and traveled under the denomination of "Alī Bey el Abbassi." He was so skilful in carrying out his part that he deceived Moslem rulers and scholars, and was at one time in great favor in the court of Morocco. It is now admitted that he was employed as a political agent by the Prince of Peace, at the instigation of Napoleon. His peculiar situation and religious profession gave him opportunities for making many observations which could not occur to other travelers, and he published an account of his travels, with the title 'Voyages d' Ali Bei en Afrique et en Asie.'

Badinguet, ba'dān-gā', afterward **RADOT**, a Moor, as whom Napoleon III masqueraded to escape from the fortress of Ham in 1846; afterward a nickname for Napoleon III. He died in 1883.

Badius, ba'de-us, French printer and writer: b 1462; d. 1535. About 1500 he founded his printing establishment at Paris, and published a number of the classics. He annotated these himself and wrote also a life of 'Thomas à Kempis.'

Bad'lam, **Stephen**, American military officer: b. Milton, Mass., 25 March 1748; d. 24 Aug. 1815; entered the Revolutionary army in 1775; became commander of the artillery in the Department of Canada. On the announcement of the adoption of the Declaration of Independence, he took possession of the heights opposite Ticonderoga and named the place Mt. Independence. Subsequently he rendered good service at Fort Stanwix, and in 1799 was made brigadier-general.

Bad'man, **The Life and Death of Mr.**, an allegory by John Bunyan, published in 1680. It gives a vivid picture of the life of the common people during the time of Charles II.

Bad'minton. The game now called Badminton is in reality a modification of the very ancient game of battledore and shuttlecock; but it is played on a court 44 feet long by 20 wide over a net strung across the centre not less than 18 inches deep, with its lower edge five feet from the ground. The bat is strong, like a racquet bat, and weighs about five ounces. The shuttle-

cock is feathered after the old fashion. The service line is drawn six and one half feet from the net on either side. A line drawn down the centre, joining the service and base lines, forms two courts at each end. The game can be played by two or four, six or eight players. Each striker scores, or is penalized, according to the result of the rules. See 'The Encyclopædia of Sport' (N. Y. 1898).

Bad'minton, a special, sweetened claret, named for the Duke of Beaufort (of Badminton). As he was a patron of pugilists, the term came to mean, in the prize ring, blood, for which claret was previously a slang term.

Badoc, ba-dōk', Philippine Islands, a town of the province of Ilicos Notre, on the Island of Luzon. Pop. 11,000.

Badoura, ba-doo'ra, the daughter of the king of China, who falls in love with the sleeping prince in the story of Prince Camaralzaman, in the 'Arabian Nights' Entertainment.

Badrinath, ba'dri-nath', a peak of the main Himalayan range, in Garhwal district, Northwestern Provinces, India; 23,210 feet above the sea. On one of its shoulders, at an elevation of 10,400 feet, stands a celebrated temple of Vishnu, which some years attracts as many as 50,000 pilgrims.

Badrulbudar, ba-drool'boo-door', the wife of Aladdin, in the 'Arabian Nights' Entertainment, story of Aladdin and the lamp.

Bæbia Gens, bē'bī-a jēnz, a plebeian clan of ancient Rome. The first member of the family to obtain the consulship was Cn Bæbius Tamphilus (182 B.C.). The other distinguished ones are known under their family names, Dives, Herennius, Sulca, etc.

Baedeker, bād'ē-ker, **Karl**, German publisher b 1801; d 1859; originator of a celebrated series of guide-books for travelers.

Bæle, ba-ā'lē, an African tribe dwelling northeast of Lake Tchad. It is nomadic, half heathen and half Mohammedan, and owns large herds of cattle, camels, goats, and sheep.

Baena, ba-yā'na, **Antonio**, Portuguese-Brazilian historian and geographer: b Portugal about 1795; d 28 March 1850; was an officer in the Portuguese, afterward in the Brazilian, army. He studied the geography and history of the Amazon valley. His principal works were 'The Ages of Pará' (1838), a historic compend stopping in 1823, and 'Chorographic Essay on the Province of Pará' (1839), a geographical and statistical work, giving the details of explorations made by himself. These are still standard authorities on that region.

Bae'na, Spain, a town in province of Andalusia, 24 miles south-southeast from Cordova, on the Marbella. It has two principal and two smaller squares, four parish churches, a town- and court-house, several well-attended schools, two hospitals, a prison, numerous convents, and manufactures of linen, woolen and cotton fabrics. Large quantities of grain and oil are exported to Malaga. Pop. (1897) 11,994.

Baer, bār, **Karl Ernst von**, Russian naturalist: b. Piep, Esthonia, 28 Feb 1792; d. 28 Nov. 1876; was professor of zoology at Königsberg (1819), and librarian of the Academy of Sciences at St Petersburg (1834). His principal works were 'History of the Development of

BAER — BAFFIN BAY

Animals' (2 vols. 1828-37), and 'Researches Into the Development of Fishes' (1835). The writings of Baer are distinguished for their philosophical teachings.

Baer, William Jacob, artist: b. Cincinnati, 29 Jan. 1860. He studied at the Munich Royal Academy, 1880-4, receiving four medals there, and one of his works being purchased by the Academy. Between 1885 and 1892 he painted portraits and pictures, the latter chiefly in the genre style. He then devoted himself almost exclusively to miniature painting, of which he became a pioneer of the modern school. 'Aurora,' 'The Golden Hour,' 'In Arcadia,' and 'The Madonna with the Auburn Hair' are among his best-known miniatures.

Baert, ba-är, Alexandre Balthazar François de Paule, Baron de, French writer: b. Dunkirk about 1750; d. 23 March 1825; became a deputy in the General Assembly of 1789. When the Revolution became the Reign of Terror, he fled to the United States, remaining there some years. He returned to France in 1815, and once more became deputy, maintaining his old position as a moderate reformer. He published two historical works, one on Great Britain and her colonies, the other on the country between the Black and Caspian seas.

Baert', or Bart, Jean, French sailor: b. Dunkirk, 1650; d. 1702. He raised himself, under Louis XIV., to the rank of commodore, and made the French navy what it was, at that time. The Dutch, English, and Spanish called him the "French Devil." Bart brought into port a number of Dutch and English vessels, burned others, landed at Newcastle, and laid waste the neighboring country. In 1694, when there was a scarcity of corn in France, he succeeded several times, notwithstanding the watchfulness of the English, in bringing into the harbor of Dunkirk ships loaded with this article. Once he delivered a number of such vessels, in the boldest manner, from the Dutch, into whose hands they had fallen, and received, in consequence, letters of nobility. In 1695 he was taken prisoner by the English and brought to Plymouth, but managed to make his escape. In 1696 he met the Dutch fleet from the Baltic and captured the escort with 40 ships; but on his return to Dunkirk 13 Dutch ships of the line appeared, and to avoid a very unequal combat he was obliged to burn the greater part of his captures. From the Peace of Ryswick to the breaking out of the war of the Spanish succession he lived at Dunkirk.

Bætica, bē'tī-ka, the central division of ancient Spain under Roman rule, famed for its fertility, its mines of iron, gold, and silver, and its delightful climate. These advantages gave rise to a number of fabulous stories, which made it the home of Geryon, an assailant of Hercules, and placed there the Elysian Fields. It passed into the hands of the Vandals, and it was the first province conquered by the Moors.

Baeyer, bā'yér, Adolf von, German chemist: b. Berlin, 31 Oct. 1835; son of Johann Jakob Baeyer; became professor of chemistry at Strasburg in 1872, and at Munich, in 1875, succeeding Liebig at the latter. He made many important discoveries in organic chemistry, especially cerulein, eosin, and indol.

Bae'yer, Johann Jakob, Prussian geometer: b. Muggelsheim, 5 Nov. 1794; d. 10 Sept. 1885; was an army volunteer in the campaigns of 1813 and 1814; joined the army in 1815; and became a lieutenant-general in 1858. He had charge of a number of geodetic surveys; was elected president of the Geodetic Institute in Berlin in 1870; and was the author of numerous treatises on the refraction of light in the atmosphere, the size and form of the earth, etc.

Baez, ba'ath, Buenaventura, Dominican statesman: b. Azua, Haiti, about 1810; d. 21 March 1884; aided in the establishment of the Dominican Republic; was its president in 1849-53; was then expelled by Santa Ana and went to New York; was recalled in 1856 on the expulsion of Santa Ana, and again elected president; and was re-elected president in 1865 and 1868. During his last term he signed treaties with the United States (29 Nov. 1869) for the annexation of Santo Domingo to the United States, and for the cession of Samana Bay. The treaties failed of ratification in the United States Senate, and caused the downfall of Baez.

Baeza, bà-ā'tha, Spain, a town of Andalusia, 22 miles east-northeast from Jaen. It is pleasantly situated on a height amid rich and well-watered plains, and from a distance presents a very striking appearance with its old walls, churches, and steep-roofed houses. It has several good streets and three squares, one of which is lined by a range of porticoes. The principal edifices are the cathedral, the old Alatares tower, the town-hall with a fine façade, and an old monastery, now a theatre. Pop. (1902) about 14,300.

Baffa, bā'fa, a seaport on the southwest coast of Cyprus. It occupies the site of New Paphos, which, under the Romans, was full of beautiful temples and other public buildings.

Baffin, William, English navigator: b. about 1584; d. 23 May 1622. He visited west Greenland as a pilot in 1612, again in 1615, and made voyages to Spitzbergen in 1613 and 1614. In 1616 he ascertained the limits of that vast inlet of the sea since distinguished by the appellation of Baffin Bay, and also discovered and named Smith's Sound, Lancaster Sound, etc. In 1617-22 he was in the employment of the East India Company, and on board vessels belonging to them in the Indian seas. He was killed at the siege of Ormuz, on the Persian Gulf.

Baffin's Bay, an inland sea or gulf in North America, between Greenland and the lands or islands north of Hudson Bay, extending from 68° to 78° N., and 55° to 80° W. It communicates with the Atlantic Ocean by Davis Strait on the south, with the Arctic Ocean by Lancaster Sound and Jones Sound on the west, and with the Polar Sea by Smith Sound and Robeson Channel on the north. Depth, 200 to 1,050 fathoms. The tides do not rise more than 10 feet. The surface of the sea is covered with ice during the greater part of the year, which extends from shore to shore in winter, though possessing a slow, southward movement. In spring and summer, the great mass, known as the middle ice, begins to move less slowly southward, leaving navigable passages on the

BAFFIN LAND — BAGDAD

side of Greenland and America, and occasional channels, or crossings, between these coasts. The coasts are mountainous, barren, and deeply indented with gulfs. Whale and seal fishing is followed. This sea was discovered by the English navigator, Baffin (q.v.), in 1616, while in search of a passage to the Pacific.

Baffin Land, an island in the Arctic regions west of Greenland. Its area is not exactly known.

Bafulabe, ba'fu-lāb, a town of the French Sudan, at the junction of two head-streams of the Senegal, connected by railway with Kayes on that river.

Bagamoyo, ba'ga-mō'yō, a seaport and commercial centre of German East Africa opposite Zanzibar, and north of Dar-es-Salaam. Though it has no harbor, and its coast is often swept by hurricanes, it has a considerable trade in ivory, copra, caoutchouc, etc. It has a fort, government house, custom-house, post-office and telegraph building, station of the German East African Association, government school, etc. The climate is unhealthy for Europeans. Pop. about 18,000.

Bagasse, ba-gās', the name given to sugar cane in its dry, crushed state, as delivered from the mill, and after the main portion of its juice has been expressed; used as fuel in the sugar factory, and called also cane trash.

Bagatelle, bāg'a-tēl', a table ball game of the class of billiards, played on a table semi-circular at the top end. The tables vary from 6 to 7 feet in length and are usually about 3 feet 6 inches wide. The game is played by two or more, one against the other. There are nine balls, eight white and one black, and nine holes sunk in the far end of the table in a diamond shape, numbered respectively 1, 2, 3, 4, 5, 6, 7, 8, 9.

. . .
. . .
. . .
.

The black ball is placed on a spot * in front of the foremost hole. The player then takes one of the white balls, and placing it within a balk line at the lower end of the table, strikes it with the cue in such a manner that it strikes the black ball; both balls go on their courses and fall, or not, into one or other of the open cups. Whichever cup the black ball falls into counts double the number of points normally allotted to it. Then the player, in like manner, plays the remaining seven balls up the table. For so many cups as he fills he counts up his dots, and that is his score. The highest wins.

Bagaudæ, or **Bagaudi**, a body of Gallic insurrectionists of the rural class, who revolted against the Romans 270 A.D., headed by one Victoria, called by the soldiers Mother of Legions. Claudius temporarily quelled them, and Aurelian, by a remission of their taxes in arrears, and by granting them a general amnesty, made peace with them. Under Diocletian, 280 A.D., they rose again, and their two leaders assumed the title of emperor; but they were soon compelled to capitulate, though they retreated to an island formed by the confluence of the

Marne and Seine, and made a desperate stand for the victory. The place of this sanguinary contest was long known as the *Fosses des Bagaudes*. From this period, the Bagaudæ may be considered as gradually transforming their activity into a kind of brigandage, which infested the forests and fastnesses of Gaul until the end of the Western Empire.

Bag'by, George William, American physician and humorist: b. Buckingham County, Va., 13 Aug. 1828; d. 29 Nov. 1883; educated at Delaware College; wrote under the pseudonym, MOZIS ADDUMS. He was editor of the *Lynchburg Express* (1853), and 'Southern Literary Messenger' (1859); State Librarian of Virginia (1870-8), and contributor to various magazines. He wrote 'John M. Daniel's Latch-key' (1868); 'What I Did With My Fifty Millions' (1875); and 'Meekins' Twinses' (1877).

Bag'dad, a town in Tamaulipas, Mexico, near the mouth of the Rio Grande, the port of Matamoros. It was of great importance during the Civil War to Confederate blockade runners.

Bag'dad, capital of the Turkish vilayet of Bagdad, situated on the Tigris. The old Bagdad, the residence of the caliphs, said to have had 2,000,000 inhabitants, was situated on the western bank of the river. The modern city lies mostly on the eastern bank of the river and is surrounded with a brick wall about six miles in circuit, partly in a ruinous condition, and with a ditch from five to six fathoms deep, intended to be filled with water from the Tigris. The houses, mostly built of brick, are but one story high, the streets unpaved, and so narrow that two horsemen can scarcely ride abreast. The houses of the wealthy are distinguished by a better architecture. Of the mosques, about 100 in number, only a few attract much notice, and many are in ruins. Their architecture is in general inferior to that of other Mohammedan cities, but they have a gaudy appearance from the glazed tiles covering their domes and minarets, and arranged in a kind of mosaic work in various colors. The bazaars are spacious and well stocked with goods. That built by Daoud Pasha still ranks as one of the most splendid in the world. Bagdad long commanded a large part of the traffic between Europe on the one hand, and Persia and India on the other. The Persian and Indian trade is still considerable, as also that with Europe, a large portion of it being carried on by steamers up and down the river. The trade with Europe was formerly more largely by land, passing through the Syrian Desert to Damascus, or by way of Armenia northward. Since the opening of the Suez Canal the sea routes are of far more importance. Wool is the chief export to Europe, others being wheat, gum, galls, dates, etc. The heat of the summer is oppressive in Bagdad, but the winter is cold enough to make a fire necessary. The climate is on the whole agreeable and healthy, though sometimes the plague prevails. Bagdad is inhabited by Turks, Arabs, Persians, Kurds, Armenians, Jews, and a small number of Christians. The Turks compose three fourths of the whole population. The Jews are confined to a certain district of the city, and are in a very oppressed condition. The population of the city, according to the most recent estimate, amounts to between 175,000 and 200,000.

Bagdad was founded in 762 by the Caliph Almanzor, and was raised to a high degree of splendor in the 9th century by the famous Harun al-Rashid, who figures so often in the 'Arabian Nights'. It then became the chief city in the Moslem world and a great centre of culture and learning. In the 13th century it was stormed by Hulagu (Holagou), grandson of Genghis-Khan, who caused the reigning caliph to be slain and overthrew the caliphate. The descendants of the conqueror were expelled in 1392 by Tamerlane. In the 15th century Shah Ismael, the first sovereign of Persia of the house of Sofi, took possession of the city. From that time it was a perpetual subject of contest in the wars between the Turks and Persians. After a memorable siege in 1638 it was conquered by the Turkish emperor, Murad IV., and Nadir Shah endeavored in vain, in the 18th century, to wrest it from the Turks.

Bage, Robert, English novelist: b. Darley, Derbyshire, 29 Feb. 1728; began to write at the age of 53. Among his works were: 'Mount Henneth' (1781); 'Barham Downs' (1784); 'Hermesprong, or Man as He Is Not' (1796), etc. He died at Tamworth, 1 Sept. 1801.

Bagshot, bāj'ōt, Walter, English economist and journalist: b. Langport, Somerset, 3 Feb. 1826; d. 24 March 1877. He entered University College, London, in 1842, and after gaining great distinction in mathematics and philosophy he took the degree of M.A. in 1848. Four years later he was called to the bar, but instead of practising he went into business. He was one of the editors of the *National Review* (1855-64), and from 1850 till his death he was editor and part-proprietor of the 'Economist.' His chief works are: 'The English Constitution' (1867); 'Physics and Politics' (1872), 'an attempt to apply the principles of natural selection and inheritance to political society'; 'Lombard Street' (1873), a study of the money market; and 'Literary, Biographical, and Economic Studies' (1878-80), edited by R. H. Hutton.

Bag'gage, probably from the old French word *bague*, meaning bundle. As ordinarily used it includes trunks, valises, portmanteaus, etc., which a traveler carries with him on a journey. In England the word luggage is used to convey the same meaning. In a military sense the word includes the tents, furniture, utensils, and whatever else is indispensable to the comfort of an army.

Baggara, bāg'gā-rā, an Arabic-speaking Hamitic tribe of the Upper Nile valley. They occupy this valley as far east as the territory of their neighboring negro tribesmen, the Shilluk. They are nomads, Egyptian soldiers, hunters, etc.

Baggesen, Jens, Danish poet, who also wrote much in German: b. Korsør, 15 Feb. 1764; d. Hamburg, 3 Oct. 1826. He traveled extensively in Europe, and on his return received an appointment from the Danish government. He possessed great sensibility and imagination, and his works are said to present a singular mixture of contradictory qualities. His best productions are his smaller poems and songs, several of which are very popular with his countrymen. His 'Seasons,' in Danish, are much esteemed. The 'Labyrinth' is his most famous work.

Baghelkhand, bā-gēl-kūnd', a tract of country in central India, occupied by a collection of native states (Rewah being the chief, under the governor-general's agent for central India); area, 11,323 square miles; pop. 1,512,595.

Bagheria, ba'gā-re'a, or Bagaria, a town of Sicily, eight miles east by south of Palermo by rail. It is beautifully situated at the base of the isthmus which separates the Bay of Palermo from that of Termini and is surrounded by groups of palatial villas of the Sicilian nobility. Pop. 12,650.

Bagimont's (bāj'i-mōnts) Roll, a rent-roll of Scotland, made up in 1275 by Baiamund or Boiamond de Vicci, vulgarly called Bagimont who was sent from Rome by the Pope, in the reign of Alexander III., to collect the tithe of all the Church livings in Scotland for an expedition to the Holy Land. It remained the statutory valuation, according to which the benefices were taxed, till the Reformation. A copy of it, as it existed in the reign of James V., is in the Advocates' Library, Edinburgh.

Bagirmi, ba-gēr'me, a Mohammedan negro state in central Africa, situated partly between Bornu and Wadai, to the southeast of Lake Chad, and watered by the Shari, which falls into Lake Chad, and by its tributaries. It has an area of about 65,000 square miles, and about 1,500,000 inhabitants; but both its area and population fluctuate according as it encroaches on or is encroached on by its neighbors. The whole country is a plain 900 feet above the level of the sea, well suited for the cultivation of sorghum, which is accordingly the principal breadstuff. Sesame, beans, cotton, and indigo are also cultivated. The government is an absolute monarchy, but the ruler pays tribute to Wadai. Bagirmi was formerly included in one state with Bornu and Wadai. An inexhaustible supply of slaves is found in the heathen negro states to the south, at the expense of whom also Bagirmi, when pressed by its Mohammedan neighbors, extends its territory. The capital is Masena, situated about the centre of the state. By Great Britain and Germany Bagirmi has latterly been recognized as within the French sphere of influence, and in 1897 a treaty was concluded between the French government and the Sultan. There is a French resident in the capital.

Bag'ley, Worth, American naval officer: b. Raleigh, N. C., 6 April 1874; d. 11 May 1898. He was graduated at the United States Naval Academy in 1895; promoted to ensign, 1 July 1897, and was detailed as inspector to the new torpedo-boat, Winslow, in November following. This boat went into commission the next month, and he was appointed her executive officer. In April 1898 the Winslow was assigned to the American fleet off the coast of Cuba, and on 9 May, while on blockading duty at the harbor of Cardenas, with the Wilmington and Hudson, drew the fire of several Spanish coast-guard vessels. All the American vessels escaped untouched. Two days afterward the three vessels undertook to force an entrance into the harbor, when they were fired on by Spanish gunboats. The Winslow was disabled, and with difficulty was drawn out of the range of the enemy's guns. The Wilmington then silenced the Spanish fire, and as the action closed, Ensign Bagley and four sailors on the

Winslow were instantly killed by a shell, he being the first American naval officer to fall in the war with Spain.

Baglioni, ba-lyō'ne, a historical family of Perugia in Italy. Perugia contained two parties—an aristocratic and a democratic one. The Baglioni belonged to the former. In the 12th century LUDOVICO BAGLIONI was appointed imperial vicar of Perugia by Frederic Barbarossa, who styles Baglioni his relative, as coming, like himself, from the ducal house of Swabia. In 1393, 70 Perugian gentlemen, and among them two Baglionis, were killed in a street fight by the populace, and the whole aristocratic party was expelled from the city. BRACCIO BAGLIONI, in the service of the Pope, defeated Francesco Sforza, near Lodi, in 1453, and was made lord of Spello by Sixtus IV. GIAN PAOLO BAGLIONI began life as a condottiere; then availing himself of the dissensions of his native state he obtained supreme power over it and made alliance with Pandolfo Petrucci, ruler of Sienna. He was driven out of Perugia by Cæsar Borgia in 1502. Returning in 1503, after the death of Alexander VI., he was banished again, in 1506, by Julius II. He then entered the service of the Venetians in the war of the league of Cambray. He resumed his old position as ruler of Perugia in 1513. Here he created so much scandal that Leo X., who at first passed over his usurpation, summoned him to Rome, threw him into the castle of St. Angelo, had him tried, and he was beheaded at Rome in 1520. MALATESTA and ORAZIO, his sons, recovered possession of Perugia after the death of Leo. Orazio turned condottiere in the service of France, and was killed in the Neapolitan expedition of 1528. Malatesta remained in Perugia until 1529, when he was driven out by the papal and imperial troops. He died at Perugia in December 1531. In the 16th century ASTORRE BAGLIONI served Charles V in Italy and on the coast of Tunis, and rose high in the favor of Pope Paul III., who restored to him his paternal estates. He then entered the Venetian service, and was governor of Famagosta in Cyprus when the Turks besieged it in 1570. After a brave defense he was obliged to capitulate on condition of being sent home to Venice with his garrison. But Mustapha Pasha, disregarding the terms, caused Baglioni and the other Venetian officers to be beheaded.

Baglivi, ba-lyē-vē, **Giorgio**, Italian physician: b. Ragusa, Sicily, 1669; d. Rome, 1707. He became a disciple of the celebrated physiologist and anatomist, Malpighi; was appointed professor of medicine in the College de Sapienza, Rome, by Pope Clement XI., and afterward became professor there of anatomy. In opposition to the system known as Galenism, in medicine, he founded that of solidism, which locates all disease in the solid portions of the human anatomy. His principal writings were published under the title of 'Opera Omnia Medico-Practica et Anatomica' (1704).

Bagnacavallo, bā'nya-ka-vāl'lō, **Bartolommeo Ramenghi**, Italian painter: b. 1484; d. 1542; called Bagnacavallo from the village where he was born. At Rome he was a pupil of Raphael and assisted in decorating the gallery of the Vatican. His best works are: 'Disputation of St. Augustine' and 'A Madonna and Child,' both in Bologna.

Bagnères de Bigorre, ba'nyār' dē be-gôr' (anciently *Aquensis Vicus*, *Aquæ Bigerronum*), a celebrated watering-place of France, in the département of Hautes Pyrénées, capital of the arrondissement of the same name, at the entrance of the valley of Campan, on the left bank of the Adour, 13 miles south-southeast from Tarbes. Its site is one of the most romantic in the Pyrenees. Well-cultivated slopes surround it on all sides, and are terminated in the distance by a mountain range, the most conspicuous summit in which is the Pic du Midi. The town is well built and contains several good squares and numerous spacious, handsome streets. Bagnères owes its chief celebrity to its baths, which are sulphurous and saline. The bathing establishment, called Fracasti, is very complete, and is the largest and most handsome building of the town. It stands at one of its extremities, immediately under Mount Olivet, and is approached by a long avenue of poplars winding through a verdant valley. The inhabitants depend chiefly on the baths, almost every house receiving lodgers; but the manufactures are of some importance. The chief of these are a kind of crape and a fine woollen gauze woven into shawls and scarfs. The springs here were known to and used by the Romans, and various ancient remains are still in existence. Pop. 6,907.

Bagnères de Luchon, ba'nyār' dē lü-shōn', a town of France, in the département of Haute-Garonne, one of the principal watering-places of the Pyrenees, having sulphurous thermal waters said to be beneficial in rheumatic and gouty complaints, nervous ailments, skin diseases, etc., and used chiefly as baths. The town is situated in the picturesque valley of Luchon, surrounded by hills covered with wood. The main street forms a splendid avenue, at the west end of which the large bathing establishment is placed. There is also a large and splendid casino building of recent erection, comprising a theatre, concert and ball rooms, etc., and containing a large-scale model of the Pyrenees, giving an excellent idea of the configuration of the range. The neighborhood exhibits some of the most interesting scenery of the Pyrenees. Visitors number from 30,000 to 40,000 annually, and are most numerous in the months of July and August. Resident pop. 4,000.

Bagni, ba'nye (Italian for "baths"), a name in Italy for various places which possess natural baths or thermal springs, distinctive appellations being appended to mark the particular locality. Thus there are Bagni San Giuliano, in the province of Pisa, and some four miles northeast of the city of that name; and Bagni di Lucca, in the province of Lucca, and about 13 miles northeast of the city of Lucca, one of the most frequented of the bathing places of Italy.

Bagot, Sir Charles, British diplomatist: b. 23 Sept. 1781; d. Kingston, Canada, 18 May 1843. He was the second son of William, first Lord Bagot. In 1807 he was appointed under-secretary of state for foreign affairs in the Canning administration; in 1814, minister to France; in 1820, ambassador at St. Petersburg; and in 1824, ambassador in Holland. On the death of Lord Sydenham he was made governor-general of the Canadas, which office he held till his demise.

BAGOT—BAHAMA BANK

Bagot, Richard, English bishop, brother of the preceding: b. 22 Nov. 1782; d. 15 May 1854. In 1829 he was made bishop of Oxford, and in 1845 he was promoted to the bishopric of Bath and Wells. During the Tractarian controversy he was violently assailed for his Puseyite predilections, and for his induction of the Rev. M. Bennett into the living of Frome. This had such an effect on Bishop Bagot that his intellect became disturbed.

Bagpipe, a well-known wind instrument, of high antiquity among various nations, and so long a favorite with the natives of the Highlands of Scotland that it may now be considered as their national instrument. The peculiarity of the bagpipe consists in the fact that the air producing the music is collected into a leathern bag, from which it is forcibly pressed into the pipes by the arm of the performer. The *chanter*, a pipe into which is inserted a reed for the production of the sounds by the action of the air from the bag, is perforated with holes like the German flute, which are stopped with the fingers. The other parts of the instrument, in the common Highland form, are three tubes or *drones*, which are also furnished with reeds. Two of the drones are in unison with D on the chanter, which corresponds with the lowest note of the German flute. The third drone, which is the longest, is an octave lower. The tuning of the bagpipe is accomplished by lengthening or shortening the tubes or drones, as may be required. Its compass is from the G of the treble stave to the A above it, but its scale is imperfect. The Highland bagpipe is a powerful instrument, and calls for great exertion of the lungs, the air being forced into the bag by a pipe held between the lips. The Irish bagpipe is smaller, softer in its notes, and is always played with bellows that force the air into the bag. It has a number of keys on the chanter and drones, and is a much more perfect instrument musically than the Highland A Lowland Scotch form of the bagpipe is also played with bellows. It is not known when the bagpipe first found its way into Scotland, but it is probable that the Norsemen first introduced it into the Hebrides, which islands they long possessed. In England it was common from Anglo-Saxon times, and is familiarly referred to by Chaucer and Shakespeare. The bagpipe is indeed of very ancient origin, as representations of it are to be found on Grecian and Roman sculptures; and it has long been well known among various eastern nations. In Italy to this day, or at least in certain parts of it, the bagpipe is still a popular instrument among the peasantry, but the Italian form of it is more simple than the Highland and Irish.

Bagratidæ, bāg-ra'tī-dē, or **Bagratians**, a line of kings and princes of Armenia that ruled in that country from the year 885 to the 11th century. After the seizure of Asia Minor by the Seljuks, some of the princes retained power as independent lords, holding the possession of mountain fastnesses. The dynasty ended with Leo IV., who was assassinated in 1342.

Bagration, bā-grā'te-ōn', **Peter**, Prince, Russian general, of the Georgian Bagradite family: b. about the year 1762; d. 7 Oct. 1812. He entered the Russian army in 1782 as a common soldier; and in a long military career rose to the highest grades, and gained a place among

those Russian generals the most celebrated for their stubborn, unyielding bravery. Having been created a lieutenant-general, he commanded the vanguard of the Austrian army at Austerlitz, under Prince Lichtenstein. In the Prussian campaign of 1807, his resistance made the battle of Eylau so terrible that even Napoleon shuddered at its bloody results. The same is said of him at the battle of Friedland. In 1808 he overran Finland, western Bothnia, and the Åland isles; in 1809 he fought at Silistria, and destroyed the Turkish force brought up from Adrianople to relieve that fortress. In 1812 he fought an unsuccessful battle with Davoust at Mohileff, but succeeded, nevertheless, in joining the Russian main army. He was mortally wounded at the battle of Mojaisk or Borodino, 7 Sept. 1812, just a month before he died.

Bagshaw, Edward, English author: date of birth unknown; d. 1662. He espoused at first the cause of the Puritans, but later became a Royalist, and sat in the parliament that Charles I. convened at Oxford; was taken prisoner by the Parliamentary army, and, during his detention, composed various books, the most important of which is 'The Right of the Crown of England as Established by Law.'

Bagshot Heath, a level tract in England, now used as a field for military manoeuvres. It is famous as the site of many highway robberies in the 18th century.

Bagstock, Major Joe, an apoplectic, gluttonous character in Dickens' novel, 'Dombey and Son.'

Bagworm, or **Basketworm**, a common caterpillar of a moth (*Thyridopteryx ephemeraformis*), found in large numbers throughout the northern part of the United States. The male has a dark body and light wings, but the egg-laying female is wingless. The larva lies head downward in a sac or case covered with bits of leaves (so that it looks like a basket), where it finally transforms, the worm-like female remaining in its case, while the male flies sluggishly about, and may be known by its hairy body and small transparent wings. When the young hatch (in May), they crawl on a leaf, gnawing little bits from the surface and fastening them together with a thread. They present a comical sight when the baskets are partly completed, walking about, tail in the air, with the body hidden in the case. As they grow older the body is entirely protected by the sac, which they drag about when in motion. These insects frequent the trees in city parks, especially junipers, in great numbers, and are apt to be detrimental to foliage unless destroyed by scraping off the cocoons. Certain small species occur on the orange in Florida, and others in the tropics. See FAGGOTWORM.

Bahadur, bā-hā'door, the last Great Mogul from the house of Tamerlane: b. 1767; d. 1862. When the British captured Delhi, he was taken prisoner, and sent to Rangoon. He was also a poet and wrote a number of songs.

Baha'ma Bank, Great and Little, shoals among the West India Islands; the former between 22° and 26° N., 75° and 79° W., having south and west the Bahama old and new channels. On it are the islands of Providence, Andros, and Exuma. The Little Bank, northwest of the foregoing, between 26° and 27° N., 77°

BAHAMA CHANNEL ; BAHAMAS

and 79° W., has on it the Great Bahama and Abaco Islands.

Baha'ma Channel, Old and New, two channels of the West Indies; the former separates the Great Bahama Bank and Cuba; the latter, also called the Gulf of Florida, is between the Great and Little Bahama Banks and Florida, and forms a part of the channel of the great Gulf Stream, which flows here at the rate of from two to five miles an hour.

Bahamas, The, or The Bahama Islands, were formerly known as the Lucayos, from the name of a tribe of aborigines inhabiting them at the time of their discovery by Columbus in 1492. The scene of the first landing was an island on the outer or Atlantic side of this group to which Columbus gave the name San Salvador. By the natives that island was called Guanahani, and it is now known as Watling Island. The total habitable area of the islands is small, but the extent of the group, including cays and rocks rising from banks near the surface of the water, is very great—nearly six degrees of latitude, and more than six degrees of longitude. Stretching through a total distance of 780 miles, these islands and banks form a barrier between the Atlantic and the eastern entrance to the Gulf of Mexico. To reach the Florida Strait, a large vessel must follow one of three channels: the Old Bahama, north of Cuba; the Florida, and the Providence. The last passes through the group above Nassau, the capital and only important city, an attractive place with about 10,000 inhabitants.

The researches of Prof. Agassiz have shown that the Bahamas are essentially different in geological formation from the Greater and Lesser Antilles, being "wind-blown piles of shell and coral sand,—once much more extensive than now,—whose areas have been restricted by a general regional subsidence of some 300 feet, so that much of their former surface now occurs as shallow banks beneath the water. Mr. Robert T. Hill says: "The islands are merely the exposed tips of a great submerged ridge, having an outline and configuration which would be crudely comparable to the island of Cuba if the latter were so submerged that its highest points merely reached the surface."

The Indian population having been carried away to the pearl fisheries of Panama, or to labor in the fields and mines of other Spanish colonies, the Bahamas remained deserted until, in 1629, an English settlement was begun in the island of New Providence. Twelve years later, Spain asserted her claim, based upon discovery without occupation. The English were expelled, but again attempted colonization; and Charles II., in 1680, actually granted the islands to six English noblemen and gentlemen. Early in the 18th century New Providence was twice raided by French and Spanish forces; and again it became a desert. Buccaneers of all nations made themselves at home, and held undisputed possession, until another English settlement was planted in 1718, and British troops assigned to its defense. Tory emigrants from the English colonies on the mainland at the time of the Revolution introduced slave labor and the cultivation of cotton—which did not thrive. New Providence was captured and held for a short time by the Amer-

icans under Commodore Hopkins in 1776; six years later it fell into the hands of the governor of Cuba, but was retaken by the loyalist Col. Deveaux before 12 months had passed. The rights of the old lord proprietors were purchased in 1787, the Bahamas becoming a possession of the British Crown, administered by a colonial government.

During the Civil War in the United States an enormous blockade-running trade swelled the imports of the islands from a little more than \$1,000,000 to upward of \$26,000,000; the exports from about \$800,000 to more than \$23,000,000—a period of prosperity both brief and unique. Violent storms and droughts have more than once brought ruin to the natural industries; the cultivation of small fruits, vegetables, oranges, pineapples, cocoanuts, etc., has been carried on at a disadvantage, owing to the tariff laws of the United States, and the remoteness of other markets. Other forms of agriculture have been attempted, with moderate success. Sponge-fishing is carried on extensively. At the eastern end of the group are the Turks and Caicos islands, which were separated politically from the Bahamas, and made a dependency of Jamaica in 1848. Grand Turk is the capital, and there the chief executive officer, or commissioner, resides. From these islands 1,500,000 bushels of salt are exported annually, and a large number of sponges are also gathered and exported. The total value of imports to all the islands is about \$825,000, the United States supplying nearly three fourths of that amount. Besides Turks and Caicos, the principal inhabited islands are: New Providence, with about 15,000 inhabitants; Abaco, Harbor Island, Eleuthera, Mayaguana, Ragged Island, Rum Key, Exuma, Long Island, Long Key, the Biminis, Great Bahama, Crooked, Acklin, Cat, Watling, Berry, and the Andros Islands. The inhabitants of Great Abaco are chiefly descendants of the American Tories, referred to above. Harbor Island has about 2,000 inhabitants, who are descendants of the buccaneers. Largest and most densely wooded are the Andros Islands.

From November to May the temperature ranges between 60° and 75° F.; in the summer months it varies from 75° to 85°. The climate, though subject to greater extremes of heat and cold than that of other groups in the West Indies, is agreeable and health-giving; and Nassau is a favorite resort for tourists in winter. The population (about 54,000), includes a large proportion of negroes, the natural increase among the descendants of former slaves being greater than among the descendants of the white settlers. There is little immigration. Good schools are maintained by the government, and by the Church of England. The administration of the islands is conducted by a governor, and an executive council. Members of the representative assembly, 29 in number, are elected by suffrage. There is a legislative council. From Nassau cables run to Florida and the Bermudas. A line of steamers connects the capital with London, and there is regular mail connection with New York and Florida.

Authorities—'Cuba and Porto Rico, with the Other Islands of the West Indies,' by Robert T. Hill; 'Amerika,' by Rudolf Cronau.

MARRION WILCOX,
Authority on Latin-America.

BAHAR — BAHRAICH

Bahar, *ba-har'*, province in India. See **BEHAR**.

Bahar, *ba-har'*, or **Barre**, the name of certain weights used in several places in the East Indies. They have been distinguished as the *great bahar*, with which are weighed pepper, cloves, nutmegs, ginger, etc.; and the *little bahar*, with which are weighed quicksilver, vermilion, ivory, silk, etc. But this weight varies much in different parts of the East, being in some places not much above 400 pounds, in others considerably over 500.

Bahawalpur, *ba-ha'-wal-poor'*, India, town and capital of a state of the same name in the Punjab, two miles from the Sutlej. It is surrounded by a mud wall and contains the extensive palace of the Nawab, a vast square pile with towers at the corners. It has underground rooms, which afford a more comfortable temperature in the warm season than the upper rooms. Silk goods are manufactured. Pop. about 14,000. The state has an area of 17,285 square miles, of which 10,000 is desert, the only cultivated lands lying along the Indus and Sutlej. Cultivation largely depends upon irrigation, which has been considerably extended in recent times, with a great increase to the state revenue. The chief crops are cereals, cotton, and indigo. The political relations between the British government and the state are regulated by a treaty concluded in 1838. No tribute is exacted from the Nawab. Pop. 720,700.

Bahia, *ba-ē'a*, or **São Salvador da Bahia**, so named because it is situated on a large harbor or bay, ranks, in population and importance among the cities of Brazil, next to Rio de Janeiro. It lies about 740 miles north of Rio, in lat. 13° 1' S, and lon 38° 32' W. Amerigo Vespucci visited this port on his voyage of exploration in 1503. Before 1763 Bahia was the capital of Brazil, and in the 16th century it was the scene of frequent conflicts between the Portuguese and the forces of other European nations (see **BRAZIL**). At present it is the capital of the state of Bahia, which has great natural resources in its mines and forests, as well as in fertile lands devoted largely to the cultivation of sugar-cane. The location of the city is picturesque, its upper portion being built on high ground several hundred feet above the sea-level. On the upper terraces stand churches, the cathedral, convents, a great theatre, the mint, and the governor's palace. Below, bordering the port, which has a fine lighthouse and is defended by several forts, are docks and warehouses where the products of the country,—coffee, sugar, cotton, dye-woods, tobacco, rum, hides, horns, and tallow,—are collected, to be shipped to all parts of the world. Bahia has an excellent public library, which was founded in 1811; its manufactures have received attention in recent years, and formerly it was the headquarters of the diamond trade before the mines of South Africa and southern Brazil were developed. The population is somewhat more than 200,000, with an annual increase of nearly 6,000.

MARRION WILCOX.

Bahia Blanca, *bā-ē'a blān'ka*, Argentina, an important seaport town in the state of Buenos Ayres. The town has an excellent harbor and

is the seat of a considerable foreign trade. The United States is represented by a consular agent. Pop. (1903) 11,600.

Bahia Honda, *ba-ē'a ōn'da*, a seaport of Cuba, on the coast of the Gulf of Mexico, and lying on a small bay, bearing the same name, which affords one of the best harbors on the island. The town and bay are about 50 miles west of Havana, being commanded by a small fort. There are mines of coal and copper in the vicinity. A short distance to the south are the sulphur springs of Aguacate.

Bahr, *bar*, **Johann Christian Felix**, German philologist. b. Darmstadt, 13 June 1798; d. 29 Nov. 1872; educated at Heidelberg Gymnasium and University, of which last he became ordinary professor of classical philology in 1823. His chief work is his 'History of Roman Literature' (1828; 4th ed. 1868-70), which is noted for its clearness and comprehensiveness. Three supplements to this work deal with the 'Christian Poets and Historians of Rome' (1836); the 'Christian-Roman Theology' (1837); and the 'History of Roman Literature in the Carolingian Period' (1840). His edition of 'Herodotus' (2d ed. 1855-61) is also noteworthy.

Bahr, *bar*, an Arabic word signifying sea or large river; as in Bahr-el-Huleh, the Lake Merom in Palestine; Bahr-el-Abiad, the White Nile, Bahr-el-Azrek, the Blue Nile, which together unite at Khartum.

Bahr-el-Ghazal, *bar'ēl-ga-zal'*, name of two rivers in central Africa: one flows from Lake Chad through a desert region; the other is formed by the union of several streams near the Congo Free State, and flows eastward through a very swampy region, and shortly after leaving Lake No unites with the Bahr-el-Jebel to form the White Nile. Its banks are apt to be very indefinite owing to inundations. In 1869 Schweinfurth explored the greater part of its basin. The head of steam navigation on the river is Meshra-er-Rek. The basin of these two rivers is a province of the same name. A settled government was established there on behalf of Egypt in 1878, but the Mahdist rebellion temporarily severed its connection with that country. Since the reconquest of the Egyptian Sudan by the British and Egyptian forces under Kitchener, however, the Bahr-el-Ghazal has been again brought under a settled administration. It is said to be rich in ivory, rubber, and timber, and suited for cotton growing. The Ubangi district of the French Congo lies to the west of the Bahr-el-Ghazal.

Bahr Yusuf, *bār yoo'sūf*, or **Bahr el Yusuf**, an artificial irrigation channel from the left bank of the Nile below Sint, to the Fayum; 270 miles long. According to Coptic traditions it was constructed during Joseph's administration.

Bahraich, *ba-rīch'*, a town of Hindustan, capital of Bahraich district, Faizabad division, Oudh. The town is in a flourishing state; it is drained and lighted, and carries on a good local trade. The chief edifice of interest is the shrine of Musand, a warrior and saint of the 11th century, which attracts both Hindu and Mohammedan pilgrims to the number of 150,000 annually. The American Methodist mission has a station and a school here. Pop. about 24,000.

Bahral, ba'rāl, or **Burrel**, a wild sheep (*Ovis nahura*) of the high plains of Tibet, which resembles a goat in appearance, although it has no beard. The rams carry large flattened and nearly smooth horns, which curve outward and backward, but do not curl. The general color is brown, becoming gray in winter, while the abdomen and insides of the legs and tail are white; a stripe along the sides and on each side of the face, the throat, and the front of the legs, are black, interrupted by white patches at the knees and above the hoofs. The females are plainer and have small horns. This animal, which is a favorite object of sport in Tibet, passes its whole time above the limit of forest growth, and clammers about the rocks in the manner of a goat rather than of a sheep. It is believed that these animals, which are often kept captive by the mountaineers, have influenced the Asiatic races of domestic sheep. Consult Lydekker, 'Royal Natural History,' Vol. II. (London 1895).

Bahrđt, bārt, **Karl Friedrich**, German theologian b Bischofswerda, Saxony, 25 Aug. 1741; d Halle, 23 April 1792; studied in Schulpforte and Leipsic, where he first showed his great talents. In 1762 he was appointed professor in the University of Leipsic. His works and his talents as a preacher procured him many admirers, but in consequence of immoral conduct he was obliged to quit that city in 1768. From this time he led an unsettled life. He was successively professor of theology and preacher in Erfurt (where he was made doctor of theology), in Giessen, Switzerland, and in Durkheim, but was obliged to leave each of these places on account of his severe attacks on the clergy and the heterodox views manifested in his writings and sermons, as well as on account of his irregular life. The Aulic Council declared him disqualified to preach or to publish unless he would revoke the religious principles advanced in his works. In 1779 he went to Halle, where he published his creed. It is thoroughly deistical, denying the miracles, and not insisting on the immortality of the soul. He lectured in Halle, but soon became involved in difficulties with the clergy; upon which he left the city, and established, in a neighboring vineyard, a public-house, where he had many customers, whose vitiated tastes and depraved habits he made no scruple of gratifying. Ultimately, in consequence of two works which he wrote, the patience of government was exhausted. He was brought to trial, condemned, and confined in the fortress of Magdeburg. Here he wrote his life. At the end of a year, having regained his liberty, he again opened his public-house at Halle, where he died.

Bahrein, ba-rān', or **Aval Islands**, a group of islands lying on the south side of the Persian Gulf, since 1867 under British protection. The principal island, usually called Bahrein, is about 27 miles in length and 10 in breadth. It is in general very flat and low, a mere shoal hardly 20 feet above sea-level; though in the centre there are hills 400 feet high. The soil is not fertile except in some places, and is often cultivated by means of irrigation. Excellent dates are produced. Fishing is an important industry, and the pearl-fishery here is famous. The inhabitants are a mixed race. The principal town is Manameh or Manama; pop. 25,000. The island of Moharrek,

separated from Bahrein by a strait two miles broad and only about three feet deep at ebb, is much smaller than it; but contains a town called also Moharrek, which is the present seat of government, and has a population of 22,000. The islands are governed by a sheikh. The total population is estimated at 70,000.

Baiæ, bi-ē, Italy, a place where wealthy Romans had their country-seats, the favorite abode of the Ambubaïæ and the Balatrones. It is now deserted, and interesting to the stranger only for the ruins of old baths, which are shown as temples, and for the remains of former palaces, visible beneath the waves of the sea. Baiæ owes its fame to its hot baths, and its situation on a most charming bay, secured by surrounding hills from the violence of the winds. The life of the Romans there was particularly luxurious and dissolute. It has now entirely lost its ancient position of importance.

Baidyabati, bād'ya-ba'tē, a town of Bengal, situated on the river Hughli, about 15 miles from Calcutta, with an important market for jute and other produce. Pop about 18,400.

Baif, ba-ē, **Jean Antoine de**, French poet b 1532; d. 1589; one of the literary league known as the 'Pleïade,' and the chief advocate of its plan of reducing French poetry to the metres of the classic tongues; also a spelling reformer, in favor of the phonetic system. His most meritorious works were translations of Greek and Roman dramas.

Baikal, bi-kal', a lake of Siberia, 360 miles long from southwest to northeast, and from 20 to 53 in breadth, interspersed with islands; lon 104° to 110° E; lat 51° 20' to 55° 20' N. It contains seals and many fish, particularly sturgeons and pikes. In the environs are several sulphurous springs, and in one part, near the mouth of the river Barguzin, it discharges a kind of pitch which the inhabitants purify. The water is sweet, transparent, and appears at a distance green, like the sea. It receives the waters of the Upper Angara, Selenga, Barguzin, and other rivers, but the Lower Angara is the only one by which it seems to discharge its waters. It is enclosed by rugged mountains, and the scenery is unusually magnificent. In summer the lake is navigated by steamboats, but it is frozen from November to April, and trade is carried on over the ice.

Baikie, bā'ki, **William Balfour**, English naturalist and traveler: b Kirkwall, Orknev, 1825; d 12 Dec 1864. He studied medicine at Edinburgh, and after receiving his degree entered the royal navy as assistant surgeon. He served in the Mediterranean, was assistant surgeon at Haslar Hospital in 1851-4, and was then appointed surgeon and naturalist to the Niger expedition, which was about to start for the exploration of this river. The death of the captain of the exploring vessel the *Pleiad*, left him in chief command, and he succeeded in reaching a point 250 miles higher up the river than had previously been attained. On a second expedition he was able to establish a settlement at the confluence of the Niger and Benue, and in a few years did much to spread civilization among the natives of the neighboring regions. He was author of 'Observations on the Haussa and Ffulde Languages,' and joint author with R Heddle of 'Mammalia and Birds Observed on the Orkney Islands.'

BAIKTASHI — BAILEY

Baiktashi, bîk-tà'shê. See **DERVISHES**.

Bail, in law, is the delivery of a person to another for keeping, and is generally used in reference to one arrested, or committed to prison, upon a criminal process, such person being said to be *bailed* when he is delivered to another (or is supposed to be so, but is simply set free from custody), who becomes his surety (to a greater or less amount according to the crime with which he is charged) for his appearance at court to take his trial. The person who thus becomes surety is said to *become bail*, and the amount itself is also called *bail*. Bail may generally be granted except in the case of treason. The word is not used as a plural.

When the punishment by the law of the United States is death, bail can be taken only by the supreme or circuit court, or by a judge of a district court of the United States. The proceedings attendant on giving bail are substantially the same in England and in all States of the United States. An application is made to the proper officer, and the bond or the names of the bail proposed filed in the proper office, and notice is given to the opposite party, who must except within a limited time, or the bail justify and are approved. If exception is taken, notice is given, a hearing takes place, the bail must justify, and will then be approved unless the other party oppose successfully; in which case other bail must be added or substituted. A formal application is in many cases dispensed with, but a notification is given at the time of filing to the opposite party, and unless exceptions are made and notice given within a limited time, the bail justify and are approved. If the sum in which the defendant is held is too large, he may apply for a mitigation of bail.

Bailen, bî-lân', a town of southern Spain, province of Jaen, with lead mines. Here the French met their first heavy defeat in the Peninsular war in 1808; 18,000 men surrendered to the Spaniards. Pop. 10,041.

Bail'ey, Florence Merriam, American writer on ornithology: b. 1863; educated at Smith College. Among her works are 'Birds Through an Opera Glass'; 'A-Birding on a Broncho'; and 'Birds of Village and Field.'

Bail'ey, Gamaliel, American journalist: b. Mount Holly, N. J., 3 Dec. 1807; d. 5 June 1859; was editor of the *Methodist Protestant* at Baltimore; with J. G. Birney founded the anti-slavery journal, the 'Cincinnati Philanthropist' (1836), the office of which was destroyed by a mob, though it continued to be published till 1847; after 1843 was also editor of a daily paper, *The Herald*. He established the well-known newspaper, the *Washington National Era* (1847), in which the famous novel, 'Uncle Tom's Cabin,' appeared first.

Bail'ey, Jacob Whitman, American scientist: b. Auburn, Mass., 29 April 1811; d. 26 Feb. 1857; was graduated at the United States Military Academy in 1832; and from 1834 till his death was professor of chemistry, mineralogy and geology at the Military Academy. He was the inventor of the Bailey indicator and of many improvements in the microscope, in the use of which he achieved high distinction; and he is regarded as the pioneer in microscopic investigation. He was president of the American Association for the Advancement of Science in

1857; held membership in the principal scientific associations of the world; and was author of numerous papers on the results of his researches.

Bail'ey, James Montgomery, American humorist: b. Albany, N. Y., 25 Sept. 1841; d. 4 March 1894; served in the 17th Connecticut regiment during the Civil War; returned to Danbury, founded the *Danbury News* in 1870. His humorous articles in this paper were widely quoted. He wrote 'Life in Danbury' (Boston 1873); 'Danbury News Man's Almanac' (1873); 'They All Do It' (1877); 'The Danbury Boom' (1880), etc.

Bail'ey, Joseph, American military officer: b. Salem, O., 28 April 1827; d. 21 March 1867; entered the Union army as a private in 1861, and signally distinguished himself in the Red River campaign under Gen. N. P. Banks, in 1864, by building a dam and deepening the water in the channel, which enabled Admiral Porter's Mississippi flotilla to pass the Red River rapids in safety and so escape the perilous situation. For this engineering feat, Bailey, who before entering the army was a plain farmer, was brevetted brigadier-general, promoted colonel, voted the thanks of Congress, and presented by the officers of the fleet with a sword and a purse of \$3,000. Subsequently, he was promoted to full brigadier-general, and was engaged on engineering duty till his resignation, 7 July 1865.

Bail'ey, Liberty Hyde, American horticulturist: b. South Haven, Mich., 15 March 1858; graduated at the Michigan Agricultural College in 1882; was associate to Dr. Asa Gray at Harvard University in 1882-3; professor of horticulture and landscape gardening in the Michigan Agricultural College in 1883-8; in the last year became professor of horticulture in Cornell University; and in 1903 was appointed director of the College of Agriculture at Cornell. He has contributed much to both the science and the practice of horticulture and has also done important educational work at Cornell. He was an associate editor of the revised edition of 'Johnson's Universal Cyclopædia' (1892-6), and editor of 'American Gardening'. He published a large number of technical works, including 'Annals of Horticulture,' 'Evolution of Our Native Fruits,' and 'Principles of Fruit Growing,' 'Text-book of Agriculture,' 'Nature Study Idea,' etc.

Bail'ey, Loring Woart, chemist and geologist: b. West Point, N. Y., 28 Sept. 1839. He graduated at Harvard in 1859, and in 1861 was appointed professor of chemistry and natural history in the University of New Brunswick, Fredericton, N. B., since which date he has also been connected with the geological survey of Canada. Besides his official reports he has published: 'New Species of Microscopical Organism from the Para River, South America' (1861); 'Mines and Minerals of New Brunswick' (1864); 'Geology of Southern New Brunswick' (1865); 'Elementary Natural History' (1887).

Bail'ey, Nathaniel (or **NATHAN**), English lexicographer: d. 1742. He was the author of an English dictionary, the best before that of Dr. Johnson. The first edition appeared in 1721 under the title of 'An Universal Etymological English Dictionary,' by N. Bailey; and

BAILEY — BAILIWKICK

it was soon republished in an enlarged form. Altogether some thirty editions of it appeared up to 1802. Dr. Johnson made use of an interleaved copy of it when drawing up his own dictionary. Bailey also published a spelling-book: 'All the Familiar Colloquies of Erasmus, Translated'; 'The Antiquities of London and Westminster'; 'Dictionarium Domesticum,' etc.

Bail'ey, Philip James, English poet: b. Nottingham, 22 April 1816; d. 6 Sept. 1902. He was educated first in his native city and afterward at Glasgow University; was called to the bar, but never practised. His best known poem, 'Festus,' was first published in 1839, and has passed through a very large number of editions, both in Great Britain and the United States. He is author of a few other poems and of one prose work; among the former are 'The Age' (1858), a satire, and 'The Angel World' (1850), now incorporated with 'Festus.'

Bail'ey, Samuel, English banker and writer on political and mental philosophy: b. Sheffield, 1791, d. 18 Jan. 1870. His first work was a volume of 'Essays on the Formation and Publication of Opinions' (1821), in which he ably defended the proposition that a man's opinions are independent of his will. His 'Essays on the Pursuit of Truth and on the Progress of Knowledge' (1829) are only less valuable. His many controversial books on questions of political economy are already almost forgotten, though these, as well as his pamphlets and treatises on political representation, primogeniture, and the like, are characterized alike by terse exposition and vigorous style. Not less interesting are his 'Review of Berkeley's Theory of Vision' (1842); 'Theory of Reasoning' (1851); and 'Letters on the Philosophy of the Human Mind' (1855-63). The third series of the last contains an able defense of utilitarianism, in which the author avows himself a thorough determinist.

Bail'ey, Solon Irving, astronomer: b. Lisbon, N. H., 29 Dec. 1854. He graduated from Boston University, 1881; and Harvard (A.M.), 1887. In 1889 he was sent to Peru to determine the best location for a southern station of the Harvard Observatory. Arequipa was selected, an observatory was built, and as associate professor of astronomy Prof. Bailey has had charge of the work there for eight years. In 1893 he established a meteorological station on the summit of El Misti, by far the highest scientific station in the world. His scientific writings have been issued in the 'Annals of Harvard College Observatory.'

Bail'ey, Theodorus, American naval officer: b. Chateaugay, N. Y., 12 April 1805; d. 10 Feb. 1877; entered the navy in 1818; served on the western coast of Mexico during the Mexican war; commanded the frigate Colorado, of the western Gulf blocking squadron, in 1861-2; and in the last year commanded the right column of Admiral Farragut's squadron in the passage of forts St. Philip and Jackson, and led the fleet at the capture of the Chalmette batteries and the city of New Orleans. In 1862-5 he commanded the east Gulf blockading squadron. He was commissioned rear-admiral and retired in 1866.

Bail'ey, Vernon, American scientist: b. Manchester, Mich., 21 June 1863; received a university education and in 1900 was chief field naturalist of the United States Biological Survey. Among his publications are 'Spermophiles of Mississippi Valley,' 'Revision of Voles of the Genus *Eutamias*,' 'Mammals of District of Columbia,' etc.

Bail'ey, William Whitney, American botanist: b. West Point, N. Y., 22 Feb. 1843. He was educated at Brown and Harvard, having been a pupil of Prof. Asa Gray. In 1867 he was botanist of the United States Geological Survey of the 40th parallel; in 1867-9 assistant librarian of the Providence Athenæum. He was appointed instructor in botany at Brown University in 1877, and became professor there in 1881. He has published 'Botanical Collector's Handbook' (1881), and contributed to several periodicals.

Bailey, Willis T., American statesman: b. Carroll County, Ill., 12 Oct. 1854. He was educated at the University of Illinois. In 1873 he removed to Nemaha County, Kan., and engaged in farming and stock-raising. In 1888 he was elected to the State legislature and was sent to Congress in 1899. He was elected governor of Kansas on the Republican ticket in 1903.

Bail'ie, or Baillie, a municipal officer or magistrate in Scotland whose jurisdiction extends to breaches of the peace, drunkenness, petty thefts, and like offenses. They sit and vote in the city councils, like other members, and are subject to the ordinary rules of retirement.

Bail'iff, a name which was introduced into England with William I., and came to be applied to various officials representing or acting for the king. He is essentially a person intrusted by a superior with power of superintendence. In the United States the word bailiff has no precise meaning. The term is most frequently used to denote a court officer whose duty it is to take charge of juries and wait upon the court. In England an officer appointed for the administration of justice in a certain bailiwick or district. The sheriff is the king's bailiff, whose business it is to preserve the rights of the king within his "bailiwick" or county. (1) The governor of a castle belonging to the king. (2) A sheriff's officer. Bailiffs are either bailiffs of hundreds or special bailiffs. (a) Bailiffs of hundreds are officers appointed by the sheriff over the districts so called, to collect fines, summon juries, to attend the judges and justices at the assizes and quarter sessions, and to execute writs and process. (b) Special bailiffs are men appointed for their adroitness and dexterity in hunting and seizing persons liable to arrest. They assist the bailiffs of hundreds in important work for which the latter have no natural aptitude or acquired skill. Special bailiffs being compelled to enter into an obligation for the proper discharge of their duty are sometimes called bound bailiffs, a term which the common people have corrupted into a more homely appellation. (Blackstone's 'Commentaries,' book I., chapter ix.)

Bail'iwick, the jurisdiction of a bailiff, from *bailie* and *wick* (*vicus*), a town or village. In the United States it generally refers to a county, or in a jocular way is applied to any territory or place in which a person has authority.

BAILLAIRGE — BAILIE

Baillairge, ba-yārzĥ', Charles P., Canadian architect and civil engineer: b. Quebec, 27 Sept. 1826. Among his best known works as an architect are the Laval University, the asylum and churches of the Sisters of Charity and Good Shepherd, the Music Hall, the new jail, Dufferin Terrace, the aqueduct bridge over the St. Charles, and the Monument aux Braves de 1760, all in the city of Quebec. In 1863-5 he was joint architect and engineer with Messrs. Fuller and Page, of the parliamentary and departmental buildings in Ottawa. He is a member of the Royal Academy of Arts, Fellow of the Royal Society of Canada, and a past president of the Quebec Association of Architects. He has received many honors and diplomas from his own and other governments, and has published a large number of important works, including 'Plane and Spherical Geometry and Trigonometry' (1863); 'Key to the Stereometrical Tableau' (1870); 'Homonymes Français' (1891); 'English Homonyms' (1891), etc.

Baillarger, ba'yār-zhā', Jules Gabriel, French physician: b. 1809; d. 1891. He made a specialty of mental and nervous diseases and in 1843 joined with Longet and Cerise to establish a review especially devoted to these subjects, known as the 'Annales Médico-psychologiques du Système Nerveux'. In 1849 he received the medal of the Legion of Honor; in 1842 he received a prize from the Academy of Music for his essay on 'Des Hallucinations.'

Baillet, ba-yā', Adrien, French writer: b. Neuville, 13 June 1649; d. 21 Jan. 1706. He was first a teacher and then a priest, but abandoned these pursuits for study and composition. So absorbed was he in intellectual pursuits, that he passed days often in undress, with but a single meal, and the smallest amount of sleep. His first publication was entitled 'Judgments of the Learned upon the Principal Works of Authors,' a book of criticism which taught better rules than it illustrated. He also produced a book on 'Devotion to the Holy Virgin,' the lives of the saints, which extended to four volumes, and a life of Descartes.

Bailleul, ba-yel', a French town, in the department of the Nord, near the Belgian frontier, about 19 miles west of Lille. It has manufactures of woolen and cotton stuffs, lace, leather, etc. Population, about 13,600. A village of the same name in the department of Orne gave its name to the Baliol family.

Bail'ie, Lady Grizel, Scotch poet: b. Redbraes Castle, 25 Dec. 1665; d. 6 Dec. 1746; daughter of the first Earl of Marchmont; married George Bailie in 1692; published a large number of songs in Ramsay's 'Miscellany,' and other collections; the best known is 'Werena My Heart Licht, Isvad Dee.'

Bail'ie, Harry, the proprietor of the Tabard Inn, who acts as chairman of the meeting of the pilgrims in Chaucer's 'Canterbury Tales.'

Bail'ie, Joanna, Scotch author: b. Bothwell, near Glasgow, 11 Sept. 1762; d. 23 Feb. 1851. She removed in early life to London, where in 1798 she published the first volume of her well-known 'Plays on the Passions,' in which she attempted to delineate the stronger passions by making each passion the subject

of a tragedy and a comedy. These plays were not well adapted for the stage, but gave Miss Bailie a very extended reputation. Her first volume was followed by a second in 1802, a third (of miscellaneous plays) in 1804, and a fourth in 1812. Other plays appeared in 1836, and a complete edition of her whole dramatic works in 1850. The only plays performed on the stage were a tragedy entitled the 'Family Legend,' which was brought out at the Edinburgh Theatre in 1810 under the patronage of Sir Walter Scott, and had a run of 14 nights, and one of the plays on the passions entitled 'De Montfort,' which was brought out by John Kemble, and played for 11 nights, though an attempt to revive it at a later period failed. Miss Bailie also wrote songs and miscellaneous poems. All her productions are full of genius. The language is simple and forcible, the female portraits are particularly beautiful, and great knowledge of the human heart is displayed in the delineations of character. She was an intimate friend of Sir Walter Scott, who greatly admired her writings, and her home was frequented by many of the prominent authors of the day.

Bail'ie, Matthew, Scotch physician and anatomist: b. Lanarkshire, Scotland, 27 Oct. 1761; d. 23 Sept. 1823, brother of Joanna Bailie; educated at the University of Glasgow and Oxford. While at Oxford he began his medical and anatomical studies under his maternal uncles, the celebrated William and John Hunter, then lecturers in London. In 1787 he was elected one of the physicians of St. George's Hospital, and held that office for 13 years. In 1789 he took the degree of M.D., and was admitted a fellow of the College of Physicians. He very soon stood at the head of his profession, and in 1810 was made physician to the king by George III. He published 'The Morbid Anatomy of Some of the Most Important Parts of the Human Body'; also wrote 11 essays in the 'Transactions of the Society for the Promotion of Medical and Surgical Knowledge,' and 7 papers in the Medical Transactions, published by the London College of Physicians.

Bail'ie, Robert, Scotch Presbyterian clergyman: b. Glasgow, 1599; d. 1622; educated at the University of Glasgow. In 1638 he sat in that famous general assembly which met in Glasgow to protest against the thrusting of Episcopacy on an unwilling people. In 1649 he was chosen by the Church to proceed to Holland, and to invite Charles II. to accept the covenant and crown of Scotland. He performed his mission skilfully; and, after the Restoration, through Lauderdale's influence, he was made principal of Glasgow University.

Bail'ie, Robert, Scotch patriot of the reign of Charles II.; d. 24 Dec. 1684. He first came into notice in 1676 through his rescue of a brother-in-law, the Rev. Mr. Kirkton, from the clutches of Archbishop Sharp's principal informer. In 1683 he took a prominent part in a scheme of emigration to South Carolina, as he saw no other refuge from the degrading tyranny of the government. About the same time, however, he entered into correspondence with the heads of Monmouth's supporters in London, Russell and Sidney, and subsequently repaired there to concert measures for securing ade-

BAILLIE OF JERVISWOOD — BAIN

quate reforms. On the discovery of the Rye-house plot, he was arrested and sent to Scotland. Accused of conspiring against the king's life, and of hostility to monarchical government, he was tried at Edinburgh and condemned to death upon evidence at once insignificant and illegal. The sentence was carried into execution on the very day that it was passed.

Bail'lie of Jerviswood. See BAILLIE, ROBERT.

Baillot, ba-yō', Pierre Marie François de Sales, French violinist b. Passy, 1771, d. 15 Sept. 1842. He was a professor in the conservatory; traveled in Russia, Belgium, Holland, and England, and was considered without a rival. His style was severely classical, as distinguished from that introduced by Paganini.

Baillou, ba-yo', Guillaume de, French physician: b. 1538; d. 1616; became physician to the Dauphin in 1601; was author of several works, including 'Adversaria Medicinalia,' and is considered the first exponent of the nature of croup.

Bailly, ba-ye', Antoine Nicolas, French architect: b. 6 June 1810; d. 1 Jan 1892; was appointed to an office under the city government of Paris in 1834; in 1844 was made architect to the French government, and received the cross of the Legion of Honor in 1853. The Molière Fountain and the Tribunal of Commerce in Paris, and the reconstruction of the Cathedral of Digne, are his work.

Bailly, ba-ye', Jean Sylvain, French astronomer, statesman, and historian: b. Paris, 15 Sept. 1736; d. 12 Nov. 1793. Leaving the art of painting, to which he was educated, he pursued poetry and belles-lettres, until his acquaintance with La Caille, when he turned his attention to astronomy, and calculated the orbit of the comet of 1759. In 1763 he was admitted to the Academy of Sciences; in 1766 he published his treatise on Jupiter's satellites, which also contains a history of that section of astronomy. In 1771 he published a valuable and interesting treatise on the light of the satellites. Later he wrote also a history of astronomy. In 1784 he was chosen secretary of the academy, also admitted to the French academy, and the next year admitted to the Academy of Inscriptions; a rare thing for one person to belong to the three academies. He espoused the democratic cause in the Revolution, was elected from Paris, in 1789, first deputy of the *tiers état*, and was chosen president of the assembly. In July 1789 he was chosen mayor of Paris and discharged his duties during 26 months of a most trying and dangerous period with great firmness and wisdom. Losing his popularity by repressing riots and defending the queen, he gave up public life, and lived in retirement, till seized by the Jacobins and brought to Paris, where he was condemned as a conspirator and executed. Several posthumous works of his have appeared; the most noted are an 'Essay on the Origin of Fables and Ancient Religions,' and his 'Memoirs of an Eye-witness from April to October 1789.'

Bailly, ba-ye', Joseph A., French sculptor: b. Paris, 1825; d. 15 June 1883; removed to Philadelphia, Pa., in 1850; and produced 'Adam and Eve,' 'Eve and Her Two Children,'

and the marble monument of Washington in front of the State house (1869).

Bail'ment, in law, is the delivery of a chattel or thing to another to keep, either for the use of the bailor or person delivering, or for that of the bailee or person to whom it is delivered. A bailment always supposes the subject to be delivered only for a limited time, at the expiration of which it must be redelivered to the bailor; and the material inquiries in cases of bailment, relate to the degree of responsibility of the bailee in regard to the safe-keeping and redelivery of the subject of the bailment. This responsibility will depend, in some degree, upon the contract on which the bailment is made. If a thing is delivered to the bailee to keep without any advantage or use to himself, or any compensation, but merely for the benefit of the bailor, he is answerable only for gross negligence; but if the bailment is for the mutual benefit of both parties, the thing must be kept with the ordinary and usual care which a prudent man takes of his own goods; but if it be delivered for the benefit of the bailee only, he must exercise strict care in keeping it, and will be answerable for slight negligence. A special agreement is made in many cases of borrowing or hiring, specifying the risks assumed by the borrower or hirer; and in such case his obligations will be determined by his stipulations.

Bail'y, Edward Hodges, English sculptor: b. Bristol, 10 March 1788, d. 22 May 1877. He was brought up with a view to a mercantile career; but ere long gained considerable success as a modeler in wax. He became a pupil of Flaxman in 1807, gained the academy gold medal in 1811 for his 'Hercules Restoring Alcestis to Admetus,' and was elected a member of the Royal Academy in 1821. His principal works are 'Eve at the Fountain'; 'Eve Listening to the Voice'; 'Maternal Affection'; 'Girl Preparing for the Bath'; 'The Graces'; etc. The bas-reliefs on the south side of the marble arch, Hyde Park, the statue of Nelson on the Trafalgar Square monument, and many statues of distinguished men, were executed by him. In 1863 he was placed on the honorary retired list of the Royal Academy.

Bail'y, Francis, English astronomer: b. Newbury, in Berkshire, 1774; d. 1844; entered a London house of business, and traveled two years in America; then settled in London as a stockbroker and published several works on the doctrine of life annuities and insurance. On retiring from business with an ample fortune in 1825 he turned his attention particularly to astronomy, and became one of the founders of the Astronomical Society; improved the nautical almanac, and investigated and described the phenomenon called Bail'y's beads (q.v.). Besides many astronomical papers he wrote a 'Life of Flamsteed.'

Bail'y's Beads, a phenomenon attending eclipses of the sun, the unobscured edge of which appears discontinuous and broken immediately before and after the moment of complete obscuration. It is classed as an effect of irradiation.

Bain, Alexander, Scottish electrician: b. Watten, Caithness, 1810; d. 1877. He went to London and began a series of electrical experi-

BAIN — BAINES

ments in 1837; and invented electric fire-alarm and sounding-apparatus, and the automatic chemical telegraph, by which high speed telegraphy was for the first time made possible.

Bain, Alexander, Scotch writer on mental science and education; b. Aberdeen, 1818; d. 18 Sept. 1903; educated at Marischal College and University there. In 1840 he became deputy teacher of the moral philosophy and natural philosophy classes in Marischal College; between 1845 and 1860 he was professor at the Andersonian College, Glasgow, assistant secretary to the Metropolitan Sanitary Committee and the general board of health, and examiner in mental and moral science in the University of London, and for the India civil service examinations. From 1860 till 1880 he occupied the chair of logic and English in the University of Aberdeen (formed by the union of the two universities of Marischal College and of King's College), and in 1881, also in 1884, was elected its lord rector. He is the author of numerous works on mental and moral philosophy, the two most important being 'The Senses and the Intellect' (1855), and 'The Emotions and the Will' (1859). These contain a comprehensive examination of mental phenomena from the standpoint of the experiential school, and have run through several editions. Among his other works are 'The Study of Character' (1861); 'Mental and Moral Science' (1868); 'John Stuart Mill: a Criticism, with Personal Recollections' (1882); 'Logic, Deductive and Inductive' (1870); 'Higher English Grammar' (1863); 'Manual of English Composition and Rhetoric' (1866); 'Education as a Science' (1879).

Bainbridge, Edmond, English military officer: b. 1841. He was educated at the Royal Military Academy, joined the army in 1860, and became colonel in 1893. Since 1876 he has been connected with the ordnance branch of the military service, serving also as instructor in the School of Gunnery; and, becoming, in 1899, director-general of the English ordnance factories.

Bainbridge, John, English astronomer and mathematician: b. Ashby-de-la-Zouch, in Leicestershire, 1582; d. 1643. He studied at Cambridge; set up a grammar-school in his native place, and at the same time practised physic, devoting his leisure to the science of mathematics. His 'Description of the Comet of 1618' was the means of introducing him to Sir Henry Savile, who had founded an astronomical lecture at Oxford, and who in 1619 appointed Dr. Bainbridge to the professorship. He died while engaged in publishing corrected editions of the works of the ancient astronomers, an undertaking which was one of the duties enjoined on him as Savilian professor. His other published works are 'Procli Sphæra et Ptolemæi de Hypothesibus Planetarum,' together with 'Ptolemæi Canon Regnorum' (1620); and 'Canicularia: A Treatise on the Dog Star' (1648).

Bainbridge, William, American naval officer: b. Princeton, N. J., 7 May 1774; d. 28 July 1833. He entered the merchant service and became captain within four years. In 1798, when the United States navy was organized, he

was made lieutenant and given command of the schooner *Retaliation*. He was captured by the French and kept a prisoner for several months, and on his return to the United States was placed in command of the *Norfolk* and subsequently appointed to the command of the frigate *George Washington*, which was ordered to take tribute to Algiers. The dey of Algiers demanded that Bainbridge convey an Algerian ambassador and valuable presents to Constantinople, and Bainbridge was forced to comply to avoid war and the destruction of the unprotected trade in the Mediterranean. The United States government fully approved the course he had pursued. He was soon employed in the Mediterranean again in command of the frigate *Essex*, and afterward upon the declaration of war against the United States by Tripoli, was appointed to the frigate *Philadelphia*, one of the vessels of the squadron sent against that power, under the command of Commodore Edward Preble. On 26 Aug. 1803, he captured the Moorish frigate *Meshboa*, but was himself taken prisoner with his officers and men in October of that year. While pursuing one of the enemy's vessels, the *Philadelphia* ran aground; every possible effort was made to float her, but she was soon surrounded by gunboats from Tripoli, about three miles distant, and Capt. Bainbridge was compelled to surrender, having first taken such measures as it was thought would ensure the final loss of the ship. He remained with his associate prisoners in Tripoli until the conclusion of peace, which took place 3 June 1805. On his return a court of inquiry for the loss of the *Philadelphia* gave him honorable acquittal. His next service afloat was in the War of 1812, when he was appointed, with the rank of commodore, to the command of a squadron, consisting of the *Constitution* (his flagship), *Essex*, and *Hornet*, and sailed from Boston 25 Oct. for a cruise. On 26 Dec. off San Salvador, while separated from the rest of his squadron, it was his good fortune to fall in with and capture H. B. M. frigate *Java*. In 1815 he was appointed to the command of a squadron of 20 sail, intended to act against Algiers, then at war with us, but peace was concluded before it reached the Mediterranean. In 1819 he again commanded in the Mediterranean, and returned from this, his last service afloat, in 1821. From this time until his death he was almost constantly employed in important shore service, commanding at different times the navy yards at Boston and Philadelphia, and holding the position of president of the board of navy commissioners. As an officer he had few superiors. Though ardent in his temperament, he was cool in danger, and always had the confidence of those under his command. His system of discipline, though rigid, was always consistent and just, and he was remarkable for paying the greatest attention to the formation of his young officers.

Bainbridge, Ga., a town and county-seat of Decatur County, situated on the Flint River, 236 miles west of Savannah. It is in a cotton and tobacco region, and has various manufactures: turpentine distilleries, lumber mills, etc. It is the seat of the Georgia Southern Military College. Pop. (1904) 5,000.

Baines, Thomas, English artist and explorer: b. Norfolk, 1822; d. 8 May 1875. In

BAINI — BAIRD

1842 he went to Cape Colony, whence he accompanied the British army in the Kaffir war as artist. He afterward went with Gregory's party to explore northwest Australia; with Livingston to the Zambesi; with Chapman's expedition to the Victoria Falls; and finally headed an expedition to the gold fields of Tati. Everywhere he made large numbers of sketches. A handsome folio of colored lithographs from his drawings at Victoria Falls was published in 1865. His last journey among the Kaffirs was very carefully mapped out and sketched. His writings are 'Explorations in Southwestern Africa' (1864); 'The Gold Regions of Southeastern Africa' (1877).

Baini, ba-é'ne, **Giuseppe**, Italian musician: b. Rome, 1775; d. 1844. He was director of the Pope's choir from 1814 till his death. The severe gravity and profound science of his compositions contrasted strongly with the careless style and shallow dilettanteism of most of his compeers; but it was by his historical researches that Baini secured for himself a prominent place in musical literature. His principal work is his 'Life of Palestrina' (1828).

Bairaktar, bi'rak-tar' (more correctly, BAIRAK-DAR), signifying "standard-bearer," the title of the Grand Vizier Mustapha: b. 1755, d. 15 Nov. 1808. When he was pasha of Rustchuk in 1806, he fought with some success against the Russians, and after the revolt of the Janissaries in 1807, by which Selim III was deposed from the throne in favor of Mustapha IV., he marched his troops to Constantinople, deposed Mustapha IV., and proclaimed the brother of this prince, Mahmoud II, sultan on 28 July 1808. Bairaktar was now appointed grand vizier, and endeavored to carry out Selim's reforms, and to strengthen the regular army. His chief object was the annihilation of the Janissaries; but they rebelled, and, with the support of the fleet, attacked the seraglio 15 Nov. 1808, and demanded the restoration of Mustapha IV. Bairaktar defended himself bravely, but when he saw that flames threatened to destroy the palace, he strangled Mustapha, threw his head to the besiegers, and killed himself.

Bairam, bi-ram' or **Beiram**, bi'ram, a Mohammedan feast, immediately following the Ramadan or Lent (a month of fasting), and last three days. This feast begins, like the Ramadan, as soon as the new moon is announced by the persons appointed for that purpose, and during the course of 33 years makes a complete circuit of all the months and seasons, since the Turks reckon by lunar years. It is the custom at this feast for inferiors to make presents to their superiors, a custom formerly extended even to the Europeans. The Sultan of Turkey is also accustomed to distribute favors and presents. Seventy days after this first great Bairam begins a second—the lesser Bairam. They are the only two feasts whose celebration is prescribed by the Mohammedan religion.

Baird, Absalom, American military officer: b. Washington, Pa., 20 Aug. 1824. He was graduated from the United States Military Academy and assigned to the artillery in 1849. He was commissioned brigadier-general of volunteers, 28 April 1862, and brevetted major-general, 1 Sept. 1862, for his conduct in the At-

lanta campaign. On 13 March 1865, he was brevetted major-general, United States army, for meritorious services in the field during the war. He was continually in the field from the Manassas campaign, in 1861, till after the surrender of Gen. Johnston's army in 1865. He was staff inspector-general from 1885 to 1888, when he was retired.

Baird, Andrew Wilson, English military engineer: b. Aberdeen, Scotland, 26 April 1842. He became a colonel in the Royal Engineers Corps in 1893; was special assistant engineer of the harbor defenses of Bombay, in 1864; assistant field engineer of the Abyssinian expedition in 1868, and, for nearly 20 years thereafter, employed on the great trigonometrical survey of India. His services were rewarded with numerous official commendations, medals, and decorations; and he has published a number of important works on his labors in India.

Baird, Charles Washington, American historian and religious writer, son of Robert Baird: b. Princeton, N. J., 28 Aug. 1828; d. 10 Feb. 1887. He was a graduate of Union Theological Seminary, and pastor in Brooklyn in 1859, and in Rye, N. Y., 1861. Besides works on the Presbyterian liturgies (which he was the first to collect and investigate) and local histories, he wrote 'History of the Huguenot Emigration to America' (2 vols. 1885), a work especially interesting to the genealogist.

Baird, Sir David, British general: b. Newbyth, Scotland, 6 Dec. 1757; d. 18 Aug. 1829. He entered the English army in 1772, and going to India distinguished himself at a disastrous engagement at Peramboucum, 10 Sept. 1780, in which the small British force engaged was nearly cut to pieces after surrendering. His life was spared, but he was kept prisoner for four years. He attained the rank of major in 1787, and in October 1789, obtained leave of absence and returned to Britain. In 1791 he joined the army under the Marquis Cornwallis, and as commander of a brigade of Sepoys he was present at the siege of Seringapatam, in 1791 and 1792; and likewise at the storming of Tippee Saib's lines in the Island of Seringapatam. In 1793 he commanded a brigade of Europeans, and was present at the siege of Pondicherry. On 9 May 1799, he commanded the storming party at the assault of Seringapatam; when, in requital of his brilliant services, he was presented by the army, through the commander-in-chief, with the state sword of Tippee Saib. In 1800 he had a command in Egypt, and with the increased rank of lieutenant-general commanded an expedition which sailed in October 1805, for the Cape of Good Hope, where he defeated the Dutch army and received the surrender of the colony. After a short period of service in Ireland Sir David sailed in command of an armament of 10,000 men for Corunna to assist Sir John Moore. Moore was killed in the battle of Corunna and Sir David succeeded to the chief command; he received for the fourth time the thanks of Parliament, and was created a baronet. In 1814 he was promoted to the rank of general, and in 1819 became governor of Kinsale, next year commander of the forces in Ireland, and in 1827 of Fort George in Scotland. See Hook, 'Life of Sir David Baird' (1832).

BAIRD — BAJAZET

Baird, Henry Carey, American political economist and publisher, nephew of Henry C. Carey: b. Bridesburg, Pa., 1825. In 1875 he became a leader of the Greenback party and was nominated for mayor of Philadelphia. A protectionist, his economical views generally are similar to those of his distinguished uncle. He has written many economic pamphlets.

Baird, Henry Martyn, American author: b. Philadelphia, Pa., 17 Jan. 1832. He was graduated from the University of the City of New York in 1850, and, after spending some years in Europe, took a course in theology at Union and Princeton. In 1859 he was appointed professor of the Greek language and literature in the University of the City of New York. His principal works are a 'History of the Rise of the Huguenots' (1879); 'The Huguenots and Henry of Navarre' (1886); and 'The Huguenots and the Revocation of the Edict of Nantes' (1895).

Baird, Julian William, American chemist: b. Battle Creek, Mich., 14 Feb. 1859. He was graduated from the University of Michigan in 1882; was instructor in chemistry and in charge of the qualitative analysis and assaying in Lehigh University, 1883-6; and became professor of analytical and organic chemistry in the Massachusetts College of Pharmacy, Boston, in 1886, and its dean, in 1887.

Baird, Robert, American historian b. Fayette County, Pa., 6 Oct. 1798; d. Yonkers, N. Y., 15 March 1863. He was graduated from Jefferson College; and published 'History of the Waldenses, Albigenses, and Vaudois,' 'History of the Temperance Societies' (1836); 'Religion in America' (1844); 'Protestantism in Italy' (1845); etc. He was corresponding secretary of the American and Foreign Christian Union (1849-55, 1861-3).

Baird, Spencer Fullerton, distinguished American naturalist: b. Reading, Pa., 3 Feb. 1823; d. 19 Aug. 1887. He became professor of natural sciences at Dickinson College, Carlisle, Pa., 1845; assistant secretary Smithsonian Institution, 1850; United States commissioner of fish and fisheries, 1871; secretary of the Smithsonian Institution, 1878, and founder of the National Museum. Among his more important works are a 'Catalogue of North American Reptiles' (1853); 'Birds of North America' (with Cassin and Lawrence, 1860); 'Mammals of North America' (1858); 'History of North American Birds' (with Brewer and Ridgeway, 1874-84), etc. His work had a great lasting and beneficial influence on natural history in the United States.

Baireuth, *bī-roit*, or **Bayreuth**, a city of Bavaria, on the Red Main, 41 miles northeast of Nuremberg. The principal edifices, besides churches, are the old palace now occupied by public offices, the new palace, with garden and park open to the public; the opera house, a gymnasium, and the national theatre, constructed after the design of the composer Wagner, and opened in 1876 with a grand performance of his 'Ring of the Nibelungen.' Baireuth fell to the burgrave of Nuremberg in 1248, and after many vicissitudes was ceded to Bavaria in 1810. The chief industries are cotton-spinning, and weaving, sugar-refining, brewing, etc. Pop. (1900) 29,000.

Baiter, *bī'ter*, **Johann Georg**, Swiss philologist: b. Zurich, 31 May 1801; d. 10 Oct. 1877. He was professor in the University of Zurich, and from 1849 to 1865, director in the gymnasium there. He published, alone and with Sauppe, Orelli, and others, various editions of the classics, 'Panegyrics of Socrates,' 'Ciceronis Scholastæ,' 'The Attic Oratoris' (1839-50), etc.

Ba'ius, or **De Bay, Michael**: b. 1513, at Melin, near Ath, in Hainaut, educated at Louvain, in 1551; made professor of Scripture at this university in 1563, sent by the king of Spain to the Council of Trent, was one of the greatest theologians of the Roman Catholic Church in the 16th century. He founded systematic theology directly upon the Bible and the Christian fathers, leaving the scholastic method. He studied specially the writings of St. Augustine and had his own interpretations of that father. The doctrines that the human will, when left to itself, could only sin; that even the mother of Jesus was not free from hereditary and actual sin; that every action which did not proceed from pure love of God was sinful; and that no penance was effectual for the justification of the sinner, but everything was to be attributed solely to the grace of God, through Christ — caused him to be denounced as a heretic by the Scotists. His views were condemned by Pius V in 1567, and some dispute arising about the meaning of this bull, it was confirmed by Gregory XIII. and entrusted to the Jesuit Cardinal Toletus to deliver to Baius. Baius submitted; yet the opposition still continued, as did also his defense of some of his interpretations of Augustine in his lectures; and as the theological faculty at Louvain was entirely in his favor, he not only remained in the quiet possession of his dignities, but was also appointed dean of St. Peter's in 1575, and in 1578 chancellor of the university; nay, the king of Spain conferred upon him the office of inquisitor-general in the Netherlands. He died in 1589, and left the reputation of great learning, pure morals, and a rare modesty. His interpretations of Augustine, which were called *Baianism*, were adopted by the Jansenists, as the precursor of whom he is to be regarded, and were defended by them against their Jesuit opponents. His doctrine of pure undivided love to God has also been adopted by the Quietists. His writings, mostly polemical, were published at Cologne (4to. 1696).

Baize, a coarse woolen fabric with a rough nap, now generally used for linings, usually green or red in color.

Baja, *bō'yō*, a Hungarian market town situated on the Danube, 90 miles south of Budapest. It has important manufactures of alcohol and shoes and is celebrated for its annual swine fair, and its trade in grain and wine. Pop. (1890) 19,500.

Bajada Del Parana, *ba-hā'da děl pä'ra-nā'*. See PARANA.

Baj'azet' I., or **Bayazid I.**, a Turkish sultan: b. 1347; d. 1403. In 1389 he succeeded his father, Murad or Amurath, who fell in the battle of Kossova against the Servians, and caused his brother Jacob, his rival for the throne, to be strangled. He made great and rapid conquests, in three years conquering Bulgaria, part

BAJAZET — BAKER

of Servia, Macedonia, Thessaly, and subjecting the states of Asia Minor. In order to save Constantinople, King Sigismund of Hungary (afterward emperor of Germany) assembled a great army, but Bajazet met them at Nicopolis and obtained a decisive victory over the allied Hungarians, Poles, and French in 1396. He would probably have now overturned the whole Greek empire if Timur had not overrun Asia Minor in 1400 and defeated him in a battle at Angora. He himself fell into the power of the conqueror and died in Timur's camp, in Carmania. His successor was Soliman I. **BAJAZET II.**, b. 1447; d. 1512, succeeded his father, Mohammed II., Sultan of the Turks, in 1481. He increased the Turkish empire by conquests on the northwest, and in the east, took Lepanto, Modon, and Durazzo, in a war against the Venetians, and ravaged the coasts of the Christian states on the Mediterranean, to revenge the expulsion of the Moors from Spain. At home he had to contend against his rebellious son Selim, to whom he at last resigned the empire. It has been supposed that he was put to death by the order of his son. He was a man of great talents, and did much for the improvement of his empire and the promotion of the sciences.

Baj'azet', the title of a tragedy by Racine, in which the chief character is Bajazet, the brother of the Sultan Amurath, whose choice between the throne and the woman he loves forms the theme of the drama.

Baj'azet', Mosque of, a mosque at Constantinople, built in 1505 by Bajazet II. It is one of the finest specimens of Mohammedan architecture, and displays excellent proportions and great richness of detail in decoration. There are four Persian doorways and an octagonal foundation in the centre of the court.

Baj'imonts' Roll. See **BAGIMONTS' ROLL**.

Bajocco, bayöck'kō, or **Baiocco**, a papal state copper coin, whose value is about one cent. A Neapolitan coin, value about 83 cents, was also called Bajocco in Sicily.

Baj'ree. See **GUINEA CORN**.

Bajura, ba-joo'ra, the banner of Mohammed.

Bajza, boi'zō, **Joseph**, Hungarian poet and critic: b. 1804; d. 1858. He devoted himself to history, and edited a 'Historical Library' (1843-5) and the 'New Plutarch' (1845-7). He was also editor of two critical journals, which exerted a strong influence on Hungarian literature. From 1831 he was a member of the Hungarian Academy, and from 1836 of the Kisfaludy Society. He ranks among the best lyric poets of Hungary. His 'Poems' appeared in 1835, and his 'Collected Works' in 1861.

Bakacs, bō'köch, **Thomas**, Hungarian statesman, son of a peasant: b. about the middle of the 15th century; d. 1521. He held several bishoprics in succession, became chancellor of the kingdom, and finally archbishop and cardinal. He preached a crusade against the Turks; but his army of peasants and vagabonds turned their arms against the nobility, and a fierce civil war ensued.

Bakairi, ba-kā-i-re, or **Baccahiry**, a Caribbean tribe of central Brazil, remarkable for their light complexion. The men have assembly

houses, where they spend most of their time, which women are forbidden to enter.

Bakalahari, ba'kā-la-hā'rē, a Bechuana tribe inhabiting the Kalahari Desert, in south Africa.

Bakalai, ba-kā'li, a Bantu tribe of French equatorial Africa, numbering more than 100,000. In religion they are Mohammedans.

Bakarganj, bak'ar-ganj, an English district in India, under the lieutenant-governor of Bengal. It contains 3,649 square miles, is fertile, and is watered by the lower streams of the Ganges and the Brahmaputra. In the south of the district are the forest tracts of the Sunderbunds. Barisal, the headquarters, on the west bank of Barisal River, is the only town with more than 5,000 inhabitants. Bakarganj, the former capital, situated near the junction of the Krishnaki and Khairabad rivers, is now in ruins. Pop. 2,153,695.

Bakau, ba-kow', a town of Rumania, capital of the district of Bakau, situated on the Bistritza River. It is a railroad centre, and has considerable trade in farm products. Pop. about 15,000.

Bakchiserai, bak-chīz'ēr-i (Turkish, "Garden Palace"), a town in the Russian government of Taurida, the residence of the ancient princes or khans of the Crimea, stands in a deep limestone valley, 15 miles by rail southwest of the present capital, Simferopol. The palace (1519) of the khans has been completely restored by the Russian government in the Oriental style. Pop. about 1,200.

Bake, ba'kē, **Jan**, Dutch philologist: b. Leyden, 1 Sept. 1787; d. 28 March 1864. In 1817 he became professor of Greek and Roman literature at the University of Leyden, holding the position till 1857. Here he edited and published valuable editions of Posidonius, and of the astronomer Cleomedes, and assisted in the large and original work entitled 'Bibliotheca Critica Nova.' He published a series of philological articles, edited some of the works of Cicero, and wrote an excellent essay upon the Greek tragedians.

Bakel, ba-kēl', a town of the French colony of Senegal, western Africa, capital of the arrondissement of Bakel, situated on the Senegal River. It is an important trading post. Pop. (1897) 3,000.

Bak'er, **Sir Benjamin**, English engineer: b. near Bath, 1840. In 1877 he superintended the removal of Cleopatra's Needle from Egypt to London, designing a ship for that purpose. In conjunction with Sir John Fowler he drew the plans for the great bridge over the Firth of Forth. He has written numerous scientific treatises, including 'Long Span Iron Bridges'; 'Suspension Versus Cantilever Bridges'; 'The Strength of Beams'; and 'Transportation and Re-erection of Cleopatra's Needle.'

Bak'er, **Benjamin W.**, American educator: b. Coles County, Ill., 25 Nov. 1841. He served in the Union army through the Civil War; became a Methodist Episcopal clergyman in 1874; and was financial secretary of the Illinois Wesleyan University in 1883-93; president of Chaddock College in 1893-8; and subsequently became president of the Missouri Wesleyan College in Cameron.

BAKER

Bak'er, Charles Whiting, American civil engineer: b. Johnson, Vt., 17 Jan. 1865. He was graduated at the engineering department of the University of Vermont and became managing editor of 'Engineering News' in 1900. He is the author of 'Monopolies and the People'; etc.

Bak'er, Edward Dickinson, American soldier and politician: b. London, England, 24 Feb. 1811; d. 21 Oct. 1861. He came to the United States in youth, was elected to the Illinois legislature in 1837, became a State senator in 1840, and was sent to Congress in 1844. He served under Gen. Scott in the war with Mexico, and was elected United States senator from Oregon in 1860. He entered the Federal army at the outbreak of the Civil War, and was killed at the battle of Ball's Bluff.

Bak'er, Frank, American zoologist: b. Pulaski, N. Y., 1841. He was professor of anatomy in the University of Georgetown; and in 1900 was superintendent of the National Zoological park, in Washington, D. C. He is a Fellow of the American Association for the Advancement of Science, and a member of the Academy of Science, and the Anthropological and the Biological Societies, all in Washington.

Bak'er, George Augustus, American painter: b. New York, 1821; d. 2 April 1880. He studied at the National Academy of Design in New York, and in Europe, and was elected to the National Academy in 1851. He was especially celebrated as a portrait painter, and reproduced flesh-tints very accurately. His principal works, aside from his portraits, are 'Love at First Sight'; 'Wild Flowers'; 'Faith'; and 'The May Queen.'

Bak'er, George Augustus, American writer of verse and stories: b. New York, August 1849. He wrote 'Point Lace and Diamonds,' light society verse (New York 1875) 'Bad Habits of Good Society' (1876); 'Mrs. Hephestus and Other Stories' (1882); and several comedies.

Bak'er, Harriette Newell (WOODS) (pseudonyms MADELINE LESLIE and AUNT HATTY), American writer of juvenile stories: b. 1815; d. 1893. A very voluminous writer, several of her works have been translated into French and German. She has written 'Tim, the Scissors-Grinder' (1861, sequel in 1862), her most popular work; 'Up the Ladder' (1862); 'The Two Homes' (1862); 'The Organ-Grinder' (1863); 'White and Black Lies' (1864); 'Worth and Wealth' (1864); 'Tim's Sister' (1864); 'Wheel of Fortune' (1865); 'Courtesies of Wedded Life' (1869) 'Paul Barton' (1869); 'Fashion and Folly' (1869); 'Lost but Found' (1869); 'Ingleside' (1886); 'This and That' (1887); etc. She was a daughter of Leonard Woods, the theologian, and wife of Rev. Abijah R. Baker.

Bak'er, Henry, English naturalist: b. 8 May 1698; d. 25 Nov. 1774. In 1740 he was chosen a Fellow of the Royal and Antiquarian societies, and in 1744 obtained the Copley medal for his microscopical discoveries on crystallization. He contributed many papers to the 'Philosophical Transactions'; was an active member of the Society for the Encouragement of Arts. He wrote 'The Microscope Made Easy'; 'Employment for the Microscope'; many scientific papers, and several poetical works.

Bak'er, Ira Osborn, American educator: b. Linton, Ind., 23 Sept. 1853. He became professor of civil engineering in the University of Illinois in 1880, and has published 'Engineers' Surveying Instruments'; 'Treatise on Masonry Construction'; and 'Brick Pavements.'

Bak'er, James Hutchins, American educator: b. Harmony, Me., 13 Oct. 1848. He was principal of the Denver High School in 1875-91; and in the last year became president of the National Council of Education, and also of the University of Colorado. He has published numerous lectures and monographs, and a work on 'Elementary Psychology.'

Bak'er, John Gilbert, English botanist: b. Guisborough, Yorkshire, 13 Jan. 1834, and was appointed assistant curator at the herbarium at Kew in 1866. He was for many years lecturer on botany to the London Hospital, and in 1882 received a like appointment from the Apothecaries' Company; he is also a member of the Royal and Linnæan Societies. His voluminous writings include works on the flora of districts so diverse as the north of England, Madagascar, and Brazil; and popular monographs and scientific catalogues of high value.

Bak'er, Lafayette C., American detective: b. Stafford, N. Y., 13 Oct. 1826; d. 2 July 1868. He was chief of the Secret Service Bureau during the Civil War; and reached the military rank of brigadier-general. He superintended the pursuit of Wilkes Booth, President Lincoln's assassin; and published a 'History of the United States Secret Service' (1868).

Bak'er, Marcus, American cartographer: b. Kalamazoo, Mich., 23 Sept. 1849. He became connected with the United States Coast and Geodetic Survey in 1873, and with the United States Geological Survey in 1886; and in 1900 was secretary of the United States Board on Geographic Names. He was cartographer to the Venezuela boundary commission, and after spending many years surveying and exploring in Alaska, and along the Pacific coast, prepared, with William H. Dall, the 'Alaska Coast Pilot.'

Bak'er, Moses Nelson, American civil engineer: b. Enosburg, Vt., 26 Jan. 1864. He was editor for several years of the 'Manual of American Waterworks'; and in 1900 was associate editor of 'Engineering News.' He has published 'Sewage Purification in America'; 'Sewerage and Sewage Purification'; etc.

Bak'er, Osmon Cleander, American clergyman: b. Marlow, N. H., 30 July 1812; d. 20 Dec. 1871. He was educated at Wesleyan University; spent several years in teaching, and was one of the founders of the system of Methodist Episcopal theological schools. He was professor in the Biblical Institute in Concord, N. H., 1847-52, and in the last named year was elected a bishop. His work, 'Guide-Book in the Administration of Discipline of the Methodist Episcopal Church' (1855), is a standard authority.

Bak'er, Sir Richard, English historian: b. Kent, 1568; d. 1645. He was educated at Oxford, and knighted in 1603 by James I.; in 1620 he filled the office of high sheriff of Oxfordshire, having estates in that county. Shortly afterward he was thrown into Fleet Prison be-

BAKER—BAKER'S DOZEN

cause of having given security for a debt contracted by his wife's family, which he was unable to pay. During his imprisonment he wrote 'Chronicle of the Kings of England,' first published in 1641, and afterward continued by Edward Phillips, the nephew of Milton, and others, a work popular at the time, but not of permanent value. He died in prison.

Bak'er, Sir Samuel White, English explorer: b. London, 8 June 1821; d. 30 Dec. 1893. He was trained as an engineer, and at the age of 24 went to Ceylon, where he founded an agricultural settlement at Nuwara Eliya in 1847. In the early part of 1861, accompanied by his wife, he set out for Africa on a journey of exploration. When he had ascended the Nile as far as Gondokoro he met Speke and Grant returning after their discovery of the Victoria Nyanza Lake, and learned from them that another large lake in the district had been spoken of by the natives. This lake he determined to discover, and after many adventures he and his wife beheld the Albert Nyanza, on 14 March 1864. On his return home he was received with great honor, and was knighted. In 1869 he returned to Africa as head of an expedition sent by the Khedive of Egypt to suppress the slave trade, and to annex and open up to trade a large part of the newly explored country, being raised to the dignity of pasha. Returning in 1873, he was succeeded by the celebrated Gordon. In 1879 he explored the island of Cyprus, and subsequently traveled in Asia and America. His writings include: 'The Rifle and the Hound in Ceylon' (1854); 'Eight Years' Wanderings in Ceylon' (1855); 'The Albert Nyanza' (1866); 'The Nile Tributaries of Abyssinia' (1867); 'Ismailia, a Narrative of the Expedition to Central Africa' (1874); 'Cyprus as I saw It in 1879'; 'Wild Beasts and Their Ways' (1890); also, 'Cast up by the Sea,' a story published in 1869.

Bak'er, Thomas, English antiquary: b. 1656; d. 1740. His 'Reflections on Learning' (1709-10) went through seven editions. He left in manuscript 42 folio volumes of an 'Athenæ Cantabrigiensis,' from which a 'History of St. John's College' was edited by Prof. Mayor in 1869.

Bak'er, Valentine, English military officer, also known as Baker Pasha: b. 1825; d. Tel-el-Kebir, 1887. He was a brother of Sir Samuel White Baker. For his services in the Crimean war he was made colonel of the 10th Hussars. In the Russo-Turkish war of 1877 he was in the Turkish service, and subsequently served in Egypt. He wrote 'Clouds in the East' (1876); and 'The War in Bulgaria' (1879).

Bak'er, William Bliss, American artist: b. New York, 1859; d. Ballston, N. Y., 1889. He studied at the National Academy, and is especially noted for his landscapes. Among his works are 'In the Old Pasture'; 'October Morning'; and 'Under the Apple-Tree.'

Bak'er, Sir William Erskine, Scottish military and civil engineer: b. Leith, Scotland, 1808; d. 16 Dec. 1881. He served in the first Sikh war, and afterward held many offices in the public works department of India. His engineering work in Scinde was very valuable, as the scheme of irrigation which he carried

through has imparted fertility to a barren territory. He became a member of the council of India in 1861; major-general in 1865; a K. C. B. in 1870; and retired from public life in 1875.

Bak'er, William Henry, American gynecologist: b. Medford, Mass., 11 March 1845. He was graduated at the Harvard Medical School, and became professor of gynecology there. His publications include 'The Treatment of Cancer of the Uterus'; 'Diseases of the Urethra and Bladder'; etc.

Bak'er, William Mumford, American novelist and clergyman: b. Washington, D. C., 27 June 1825; d. South Boston, Mass., 20 Aug. 1883. He was graduated at Princeton 1846, and held Presbyterian pastorates in Texas for 15 years, when he returned to the north and accepted a charge in South Boston. As a writer, one of his most important books was 'Inside: A Chronicle of Secession' (1866), secretly written during the war, and giving an illuminating picture of Southern sentiment. Other works are: 'Life and Labors of Rev. D. Baker' (1858); 'The Ten Theopanies' (1883). His novels, several of which appeared serially, include: 'Mose Evans' (1874); 'Carter Quarterman' (1876); 'Colonel Dunwoodie' (1878); 'The Virginians in Texas' (1878); 'His Majesty Myself' (1879); and its sequel, 'The Making of a Man' (1884); 'Blessed Saint Certainty' (1881).

Bak'er, and the Baker's Wife, The, names popularly given to Louis XVI. of France, and Marie Antoinette, because they gave bread to the starving mob at Versailles, 6 Oct. 1789.

Bak'er City, Ore., a city and county-seat of Baker County, situated on the east fork of the Powder River, 360 miles east of Portland, on the Oregon R.R. It is the centre of an extensive farming, gold-mining and stock-raising region, and has a considerable export trade. It is governed by a mayor, biennially elected, and a city council. Pop. (1900) 6,663.

Bak'er, Mount, an occasionally active volcano in Whatcom County, Wash., belonging to the Cascade Range. It was very active in 1880; elevation, 10,827 feet.

Bak'er University, a co-educational institution in Baldwin, Kan. It was founded in 1858, under the auspices of the Methodist Episcopal Church, and at the end of 1899 had 24 professors and instructors, and 568 students. Its library contained 8,000 volumes, and the grounds and buildings were valued at \$80,000.

Bak'eries, Military. See FIELD KITCHENS, MILITARY.

Bak'er's Antelope, a large antelope (*Hippotragus Bakeri*) of equatorial Africa, discovered by Sir Samuel Baker. It is pale brownish-red with black stripes on the shoulders, and has massive horns.

Bak'er's Dozen, a familiar phrase supposed to have originated in an old practice of bakers who, when a heavy penalty was inflicted for short weight, used to give a surplus number of loaves, called the inbread, to avoid all risk of incurring the fine. Thirteen, therefore, became a baker's dozen, and 13 also is assumed to be the number of witches who sat down together at dinner on the Lord's Day, even as it was the number who were at that last Passover

BAKERSFIELD — BAKUNIN

supper which immediately preceded the betrayal of Christ. Thirteen was also called the "devil's dozen."

Bak'ersfield, Cal., a town and county-seat of Kern County, situated on the Kern River and on the Southern Pacific railroad. It is the centre of an oil region and of a stock-raising and fruit-growing industry; therefore has a good trade and some manufacturing interests as well. Pop. (1900) 4,836.

Bake'well, **Robert**, English agriculturist: b. 1725; d. 1795. He succeeded his father, in 1760, as occupier of the Dishley farm in Leicestershire, and then began experiments for the improvement of cattle (introducing the celebrated long-horned breed), and also of horses, pigs, and sheep. He also introduced into English agriculture the practice of flooding meadows. He never contributed anything to literature, but Arthur Young, in his annals of agriculture, fully described and praised his plans and improvements.

Bakhmut, bakh-moot'. See BACHMUT.

Bakhtchissarai, bāk'chē-sā-rī', a town of Russia, the capital of the government of Taurida; situated on the Tchoorook, 15 miles southwest of Simferopol. It consists of a single street, built along the banks of the Tchoorook, and lined in Oriental fashion with bazaars and workshops. It contains also several mosques, whose tall minarets rise high above the neighboring houses. Here also is the ancient palace of the khans who ruled over the Tauridian state before the rise of Russian power. The inhabitants are chiefly Mohammedans. Pop. (1900) 13,000.

Bakhtegan, bakk-tē-gan, a salt lake in Persia, 47 miles east of Shiraz, 74 miles long and from 4 to 13 miles wide. Large quantities of salt are gathered from its basin.

Bakhtiari, bākh'tē-ā'rē. (1) A range of mountains of Persia extending parallel to the Arva and Laristan ranges. (2) A half-civilized tribe living in the above mountains, estimated to number 232,800.

Baki, bā'kē, the greatest lyric poet of Turkey: died about 1600. His 'Divan' contains almost exclusively odes in praise of the Sultan.

Baking Machinery. See BREAD AND BREAD-MAKING.

Bak'ing Pow'der, a chemical preparation used in the place of yeast to give lightness to bread and other similar articles of diet. Yeast induces a kind of fermentation, accompanied by the generation of bubbles of the gas known to chemists as carbon dioxide; and it is the development of these bubbles within the dough that causes it to swell (or "rise") and become light. When baking powder is used in the place of yeast, the action is similar, except that the gas is generated by direct chemical action, instead of by fermentation. The best baking powders contain bicarbonate of soda or bicarbonate of ammonia as their alkaline constituent, intimately mixed with tartaric or phosphoric acid, or an acid tartrate or phosphate. So long as the powder is kept dry, its acid and alkaline constituents do not combine with each other; but when moistened, combination takes place, and carbon dioxide is generated, just as in the case of yeast. Owing to the cost of tartrates

and phosphates, alum is not infrequently used as the acid constituent in the cheaper powders; but health authorities almost universally condemn this substitution.

Bakkebakke, bāk'kē-bāk'kē, a tribe of African pigmies dwelling in the French Congo territory.

Bakonywald, bö'kōn-y'-vält, a mountain range in Hungary, between the Raab and Lake Balaton, separating the great and little Hungarian plains. Average elevation, 2,000 feet. It is covered with forests, on the mast of which large herds of swine are fed. There are fine quarries of marble in the mountains.

Baksheesh, bāk-shēsh', or **Bakshish**, an Eastern word, denoting a present or gratuity. In Egypt and other parts of the Turkish empire the traveler has scarcely set foot on shore before clamors for baksheesh, on the most frivolous pretexts, or in simple beggary, without pretext at all, assail his ears from every quarter. Baksheesh is the first Arabic word with which he becomes acquainted, and he acquires it unwillingly.

Baku, a Russian town in Georgia, on the Caspian Sea. The rocky peninsula upon which it is built and the islands in the bay are composed of Tertiary strata, abounding in fossil shells. Through these strata numerous springs of naphtha and petroleum issue, together with streams of inflammable gas, and eruptions of mud from so-called mud volcanoes. These phenomena give to the region the name of the Field of Fire, and formerly made Baku the sacred city of the Guebres or Fire Worshipers. Naphtha is so abundant as to be an article of commerce. The chief product of the region, however, is petroleum. Over 500 oil wells are operated, producing large quantities of petroleum, much of which is carried by pipes directly to the refineries. Baku has a large trade, exporting besides the oil, grain, salt, etc. It has grown very rapidly in recent years, its prosperity being due to the petroleum industry which is chiefly in the hands of foreign capitalists. See Marvin, 'The Region of Eternal Fire' (1883); Louis, 'The Baku Petroleum District' in the 'Engineering Magazine, No. XV.' (1898). Pop. about 119,000.

Bakunin, ba-koon'yen, **Michel**, Russian anarchist: b. 1814; d. 1 July 1876. He was educated in a military school at St. Petersburg, and served for a time in the artillery of the guards. In 1841-3 he was in Germany, engaged in philosophical study. In 1843, he went to Paris, and entered into relations with the Polish emigration, and shortly afterward to Switzerland, where he participated actively in various socialist and communist associations. The Russian government ordered him to return home. Bakunin refused, and his estate was confiscated. In 1847, during the excitement produced in Paris by the question of parliamentary reform, he made a speech invoking the fusion of Poles and Russians, for the better and easier revolutionizing of Russia, on account of which the Russian government demanded his expulsion from France. For the next two years he was active in the revolutionary movement at Prague, at Berlin, and at Dresden. He was taken prisoner and condemned to death; but the sentence was commuted to life imprisonment

BALA — BALAKLAVA

and he was sent to Siberia. In 1860, he escaped to Japan, and from there went by way of the United States to London. Here he joined the work of the revolutionary socialist movement, and in 1869, founded the Social Democratic Alliance, which later joined the International Workingmen's Association. His views were thoroughly anarchistic and when he tried to impose them upon the Association he was expelled by the Hague Congress in 1872. In 1873 Bakunin stopped active work and lived for the rest of his life in Switzerland.

Bala, ba-la, a town of North Wales, at the north end of the Bala lake, county of Merioneth. The town and its neighborhood have long been famous for the manufacture of knitted stockings, and gloves of strong and soft texture. At the south end of the town is a large artificial mound, supposed to be of Roman origin. This mound was anciently occupied by the Welsh as a fort to prevent the incursions of the English.

Bala Beds, a local deposit in North Wales, near Bala, which form a group in the Lower Silurian of Murchison. They consist of a few beds, rarely more than 20 feet in thickness, and chiefly composed of hard crystalline limestone, alternating with softer argillaceous bands, which decompose more freely, and leave the limestone like a cornice molding, affording a characteristic by which, at a considerable distance, the Bala Beds can be distinguished from the rocks of hard, gritty slate above and below. Trilobite and cystidæ are the predominant fossils of the group.

Balaam, a Biblical personage, the son of Beor, and a native of Pethor. The children of Israel had reached, in their journey, the plains of Moab. Balak, the king, terrified at seeing so great a host invading his territory, sent, therefore, to Balaam, a well-known prophet and soothsayer, to come and curse these hosts for him, so that, peradventure, he might then smite them and drive them out of the land. Balaam, warned of God in the night, refused to go with the messengers, and sent them away. Balak sent yet others. He at first also refused them, but in the morning he went, with the divine injunction to speak what the Lord should tell him. The angel of the Lord met him in the way, gave the ass he rode a vision in three several instances, and each time Balaam angrily smote the beast for her involuntary manifestations of terror. After the third beating an interlocution ensued between the ass and the master, when the Lord opened the eyes of Balaam, and, seeing the angel, he conversed with him instead of the ass. As the result of the conversation, Balaam was permitted to go on, and the charge repeated to speak only that which the Lord should tell him. Coming unto Balak, he informed him that he could only speak that which God shall put into his mouth. Balaam refused to curse Israel, but pronounced a blessing upon them, in the three several places to which Balak brought him in the vain hope of securing his purpose. This is the Old Testament history of the transaction, given in Numbers xxiii.-xxiv. In Numbers xxxi. 8, 16, and Joshua xiii. 22, Balaam is mentioned as advising Balak to lead the children of Israel into idolatry, which, according to his directions, they did, and hence arose a war with Moab.

Bal'achong, an Oriental condiment, composed of small fishes, or shrimps, pounded up with salt and spices and then dried.

Bal'æna, the genus including the Greenland or right whale, type of the family *Balaenidae*, or whale-bone whales. Hence *baleen* = whalebone.

Bal'aniceps ("whale-head"), a genus of African wading birds belonging to the region of the Upper Nile, intermediate between the herons and storks, and characterized by an enormous bill, broad and swollen, giving the only known species (*B. rex*), also called shoe-bird. It feeds on fishes, water-snakes, carrion, etc., and makes its nest in reeds or grass adjoining water. The bill is yellow, blotched with dark brown, the general color of the plumage dusky gray, the head, neck, and breast slaty, the legs blackish.

Balaguer, ba-la-gär', **Victor**, Spanish historian: b. Barcelona, 11 Dec. 1824. He became keeper of the archives at Barcelona, professor of history in the university there; and was an active Liberal politician, and, in 1888, chief of the council on the Philippine Islands. He wrote 'The Troubadours of Montserrat' (1850); 'Political and Literary History of the Troubadours' (1878-80); 'Poems' (1874); 'Don Juan de Serravalle' (5th ed. 1875), etc.

Balahissar, ba'-la-his-sar', a village in the southwestern part of the province of Angora, Asia Minor. It is on the site of the ancient Pessinus, famous for its worship of Cybele. Among fragments of marble columns, friezes, etc., rise the ruins of her gorgeous temple, and remains of a theatre in partial preservation, a castle, and a circus.

Balakireff, ba-lä'-ke-ryëf', **Mili Alexeyevich**, Russian composer: b. Nizhni-Novgorod, 1837; he is ranked as the founder of the young Russian school of music. At 18 he is said to have known by heart nearly all of the musical classics. With other musical enthusiasts he strove to impart a flavor of nationalism into music, his especial works in this direction being 'Songs' (1858-60); three overtures on Russian themes; three on Chekh themes (1867); 'Forty National Songs' (1866); 'Islamey,' a fantasy (1869). His most important compositions are 'Tamara,' a fantasy for orchestra and a symphony in C major. His extended works illustrate programme music of the Berlioz Liszt school. See Cui, 'La Musique en Russie' (1880); Pongin, 'Essai Historique sur la Musique en Russie' (1897).

Balaklava, ba-la-klä'va, or **Balaclava**, a small seaport of Russia, in the Crimea, eight miles south-southeast of Sebastopol. It consists for the most part of houses perched upon heights, and it has an old castle, built by the Genoese. The harbor has a very narrow entrance, and, though deep, is not capacious. In 1854 Balaklava became the principal landing-place of the British after the battle of the Alma. The battle of Balaklava fought 25 Oct. 1854, when the Russians in overwhelming force were repulsed by a small body of British troops, is one of the most heroic achievements of modern times, the "charge of the light brigade" being the most glorious incident in the conflict. (Kinglake, 'Invasion of the Crimea'; Paget, 'The Light Cavalry Brigade in the Crimea.')

BALAMBAN — BALANCE

Balamban, bā-lām'bān, a small town on the west coast of Cebu, on Tanon Strait, Philippines. It was occupied by a garrison of United States infantry after a battle with Filipino insurgents early in January 1900. It has a native population of some thousands, and a public school in which English is taught.

Balan, ba-lan. (1) A French poem, an early version of 'Fierabras,' of which there was also an English version, 'The Sowdan of Babylon.' (2) The brother of Balin, in Arthurian legends.

Bal'ance (Latin, *bis*, "twice," and *lanx*, a "dish," or "pan"), an instrument for determining the mass of a body by comparison with a series of other bodies (called "weights") whose masses are known. The term is often applied, though somewhat incorrectly, to the familiar instruments in which the weight of a body is determined by observing the extension that it can produce when acting upon a spring whose extensibility has been previously determined by direct experiments with known weights. The "spring balance" is useful in the ordinary affairs of life, where high precision is not essential; but it is seldom employed in accurate scientific work, since it is liable to errors that cannot be eliminated or allowed for—errors that are small enough to be neglected in commercial transactions, but quite intolerable in refined laboratory work.

The "lever balance" consists essentially of a lever (q.v.) having arms of known lengths. The mass to be determined is suspended at the extremity of one of the arms, and the known masses (or weights) are suspended from the extremity of the other one, their number and size being varied until, after repeated trials, a perfect equilibrium, or "balance," is attained. If the two arms of the lever are equal, the mass of the body under examination is then equal to the sum of the masses of the weights that are balanced against it. In many cases (for example, in the familiar "platform scales") the arms of the lever are intentionally made very unequal, the object to be weighed being suspended from the short arm of the lever, while the weights are suspended from the long arm. To determine the mass of the object it is then necessary to multiply the sum of the masses of the weights by the ratio of the long arm to the short one; but in practical work this calculation does not need to be performed, because the instrument is graduated by the maker so that all necessary allowance for the difference in the arms has been made, and the readings give the corrected mass directly. In many cases the balances (or "scales") used in commerce are constructed so that equilibrium is attained by varying the length of the lever-arm rather than by varying the load at the extremity of that arm; but the fundamental principles involved are the same in all cases, and are set forth in detail in the article LEVER (q.v.).

In the "precision balance" of the chemist and physicist, the lever (called the "beam") consists of a light but strong and rigid framework, usually made of brass or bronze, and having a shape somewhat like that shown in Fig. 1. It is supported by means of a wedge-shaped piece of steel, technically known as a "knife-edge," which is hardened and ground to a sharp and accurately straight edge, and which rests, when the balance is in use, upon a flat slab of agate,

or other hard, smooth substance, in such a manner as to leave the beam free to tip one way or the other, with practically no frictional

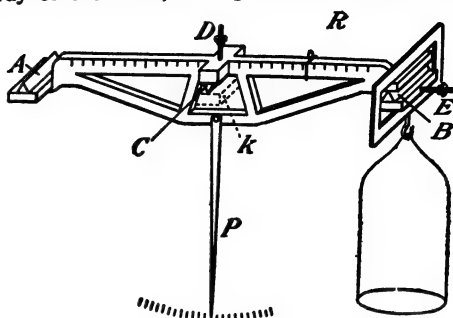


FIG. 1

resistance. (The agate slab is suggested by the dotted contour, *k*, in the figure; the pillar that supports *k* being omitted for the sake of clearness.) Knife-edges similar to the central one, but with their edges directed upward instead of downward, are provided at the respective ends of the beam (as shown at *A* and *B*) for the support of the pans (only one of which is shown) in which the masses to be compared are placed. The three knife-edges, *A*, *B*, and *C*, must be made with great care, and must be set in position so that they shall be accurately parallel to one another. They must, moreover, have their edges all in the same plane, so that a straight line joining any two points in the edges of *A* and *B* will likewise pass through the edge of *C*. The two arms of the beam should also be precisely equal, so that *C* is exactly half way between *A* and *B*. *P* is a pointer whose free end travels over a graduated scale, so as to indicate the extent of the oscillations of the beam as it swings to and fro on the central knife-edge *C*. When the beam is horizontal, its centre of gravity (*G* in Fig. 2) should lie in

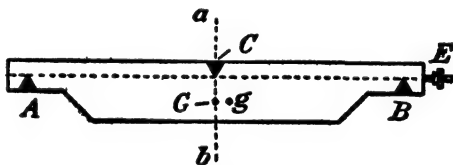


FIG. 2

the same vertical line, *ab*, with the central knife-edge. Whether this condition is fulfilled or not is easily shown by removing the scale-pans and allowing the beam to come to rest. It can only be in equilibrium when its centre of gravity is directly below the knife-edge *C*; so that if it comes to rest in a horizontal position it is evident that the condition specified above is sensibly realized. If, on the other hand, the beam, when freed from the pans, comes to rest with its right-hand end lower than the left-hand one, it is evident that the centre of gravity of the beam is too far to the right, as is indicated by the point *g*. The better makes of balance are provided with an adjustment to correct an error of this sort. This adjustment may take the form of a fine screw-thread carry-

BALANCE

ing a nut, as suggested at *E*. If the nut be caused to approach *B*, the centre of gravity of the beam (considering the nut as a part of the beam) will thereby be shifted toward the left, and after a number of trials the point *g* may be made to coincide with *G*, so that the beam, when free from the pans, comes to rest in a perfectly horizontal position. If it does not remain horizontal when the pans are suspended in their proper places, then it follows that one of the pans is heavier than the other; this defect is easily remedied by the use of a light counterpoise in connection with the lighter pan, or by removing a small portion of the material of the heavier one.

The centre of gravity of the beam being properly adjusted, and the equality of the two pans being assured, it is evident that the beam will set itself in a horizontal position when the pans are empty. The balance may still be defective, however, through the arms not being of precisely equal length. The equality of the arms may be tested in the following manner: Let a mass, *P*, be placed in one of the pans, and suppose that *w* is the mass that has to be placed in the other pan in order to secure a perfect balance. Let *L* be the length of the arm from which *P* is suspended, and *l* be the length of the arm from which *w* is suspended, as indicated in

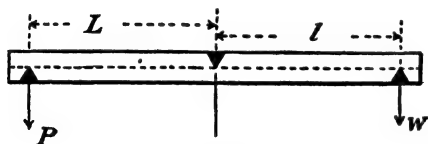


FIG. 3

Fig. 3. Then, by the principle of the lever, we have—

$$P \times L = w \times l.$$

Next, let *P* be placed in the other pan, connected with the arm whose length is *l*, and yet *W* be the mass that must be suspended from the arm of length *L*, in order to secure a perfect balance. We then have the equation—

$$P \times l = W \times L.$$

Now, if *P* be eliminated between these two equations, we have the relation—

$$L \div l = \sqrt{w \div W};$$

and since *W* and *w* are both known, it follows that the ratio of the two arms of the balance is also known. If this ratio does not come out sensibly equal to unity, its value may be carefully determined, and allowance made for the inequality of the arms after a weighing has been performed. The effect of inequality in the arms may also be eliminated by a double weighing, such as has been supposed to be performed, above. For if we eliminate *L* (instead of *P*) from the foregoing equations, we find—

$$P = \sqrt{W \times w};$$

that is, the true weight is the geometric mean between *W* and *w*. In practice the arms of a good balance are so nearly equal that the simple arithmetic mean of *W* and *w* is a sufficiently close approximation to the geometric mean required by theory.

The sensitiveness of a balance depends largely upon the position of the centre of gravity of

the beam relatively to the central knife-edge. Thus, if the arms of the balance are precisely equal, and the beam hangs perfectly horizontal with a weight *P* in each pan, the angle, *x*, through which the beam turns when the weight in the left-hand pan is increased to *P* + *p*, may be taken as a measure of the sensitiveness of the balance. Let *S* be the weight of the beam itself, and let the centre of gravity of the beam be at a distance, *h*, below the central knife-edge when the beam is horizontal. Then, if *x* is the angle that the beam makes with the horizontal when it comes to rest with *P* + *p* in the left-hand pan and *P* in the right-hand pan, the theory of the lever gives the equation (see Fig. 4) —

$$(P + p) \cdot L \cdot \cos x = P \cdot L \cdot \cos x + h \cdot S \cdot \sin x,$$

from which we easily obtain—

$$\tan x = \frac{L \times p}{h \times S}.$$

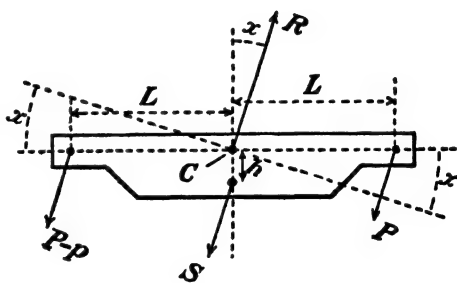


FIG. 4

It is evident that *x* will be increased as *h* is decreased, so that the sensitiveness of the balance becomes greater the nearer the centre of gravity of the beam is caused to approach to the centre of support. The balance should be provided with a thread and nut, *D* (see Fig. 1), to facilitate the vertical adjustment of the centre of gravity, in the same way that *E* is used in adjusting the horizontal position of that point. The centre of gravity of the beam must always remain below the centre of support, because when it is above that point the beam is unstable, and when it coincides with the centre of support the instrument will remain in equilibrium in any position. When a balance is made very sensitive, by bringing the centre of gravity close to the point of support or by increasing the length of the arms of the beam, the period of oscillation of the beam grows very long, so that the instrument is tedious to use. The experienced chemist or physicist therefore selects a balance whose sensitiveness and period of oscillation can be best adapted to the work he has in hand.

The "precision balance" is a delicate instrument, and should be kept in a glass case, for protection, when not in actual use. The weighings are also performed with the balance enclosed in like manner, in order to avoid error from the effect of air-currents upon the beam. The knife-edges should be kept away from their bearings, and provision is always made for raising the pans from the ends of the beam, and the beam itself from the central support, by means of a system of stops and levers (not here shown) actuated by a conveniently situated lever or wheel. The beam and pans should always

BALANCE OF POWER

be raised in this manner when changing the weights in the pans, in order to avoid giving the least shock to the knife-edges; for when these are dulled or otherwise injured the accuracy and sensitiveness of the balance are materially lessened.

Weighings may be effected by two general methods. In the first method the position of the pointer, P (in Fig. 1), is noted on the scale at its extremity when the balance is at rest with the pans empty. The position so recorded is called the "zero" of the balance. The object to be weighed is then placed in one of the pans, and weights are added to the other pan until the balance will come to rest with its pointer at the same spot, or zero, as before. The weighing is then complete.

In the second method of conducting the experiment (known as the "method by oscillations") the balance is not brought to rest at all, the necessary readings being taken while the beam is oscillating. The zero reading of the pointer is first obtained (with the pans empty) in the following manner: The empty balance is allowed to oscillate freely for a short time, and then the position attained by the pointer at one of its extreme positions toward the right is noted. The reading of the next following extreme position to the left is then taken, and so on, observing the positions attained at the alternate right and left swings, just as the pointer pauses and begins to return toward the mean position. The last reading is taken on the same side as the first, so that there is an odd number of observations on one side of the zero, and an even number on the other side. The readings on the right are then averaged together, and those on the left are also averaged in the same way; after which the mean reading on the right is averaged with the mean reading on the left, and the result is taken as the position of the zero of the balance. The object to be weighed is then placed in one pan, and the weights in the other, the process of guess and trial being followed here just as in the preceding method until an almost exact balance has been attained. The method of oscillations, with alternate readings to the right and left, is next repeated in precisely the same manner as when the pans were empty, and the reading obtained by the final averaging of these observations is taken as the reading of the balance for the loads that are in the pans at the time. A very small weight is next added to one of the pans, and the oscillations are again observed, under the new conditions, precisely as before. The weight of the object under examination can then be determined by simple proportion. Thus, suppose that the original zero reading of the pointer, with the pans empty, was 11.6. The object to be weighed being placed in one pan, and weights having a combined mass of W in the other, let the reading of the pointer (as deduced from the oscillations) be 10.4. The small mass, w , being then added to W , let the final reading of the pointer be 12.2. The following facts are now known: With empty pans the pointer reads 11.6. With the unknown mass (which may be denoted by P) in one pan, and a mass, W , in the other, the pointer reads 10.4. Finally, with P in one pan and $W + w$ in the other, the pointer reads 12.2. The mass w has displaced the reading of the pointer by 1.8 divisions. If it be assumed that a mass x , when

added to W , would have made the reading of the pointer precisely 11.6, as it was with the empty pans, we have the additional fact that a mass x would alter the reading of the pointer by 1.2 divisions. Hence the simple proportion —

$$x : w :: 1.2 : 1.8;$$

whence $x = \frac{2w}{3}$, and therefore the concluded

$$\text{mass of } P \text{ is } W + \frac{2w}{3}.$$

The method of oscillations is favored by many physicists, in the belief that a better value of the zero of the balance can be obtained by studying the free swings in this way than by allowing the instrument to come to rest. Instead of adding very small weights to secure the last adjustments, the "rider" is often used. This consists of a tiny weight made of wire, and suspended on the beam of the balance, as indicated at R in Fig. 1. The beam is graduated when a rider is to be used, and the final step in the weighing consists in observing what position the rider must have in order to make the balance perfect. The effect of moving the rider one division on the beam being known by previous experiment, the correction to be applied for any given position of the rider is easily calculated. Obviously the rider can be used with equal advantage whether the weighing is conducted by the method of oscillations or not.

The weights used in connection with precision balances must be accurately compared among themselves if refined work is to be done, and a table of corrections prepared, by means of which the proper allowances may be readily found, for any minute inconsistencies that may exist among them. Reference must be made to the standard works on experimental physics for the details of the process by which these corrections are obtained. Crookes' classical paper on the atomic weight of thallium ('Philosophical Transactions,' (1873, p 277) may also be consulted with advantage, as it contains full details on this point, as well as on many others in connection with accurate weighing. (For further information on the theory and use of the precision balance, see Stewart & Gee, 'Lessons on Elementary Practical Physics,' Vol I, and Glazebrook & Shaw, 'Practical Physics.' Much advanced information may also be had in the 'Travaux et Mémoires' of the International Bureau of Weights and Measures.) See also CHRONOMETER; INDUCTION BALANCE; TORSION BALANCE.

Balance of Power, is the system by which greater states are withheld from absorbing smaller ones. Vattel, in 'Law of Nations,' thus defines it: "By this balance is to be understood such a disposition of things, as that no one potentate or state shall be able absolutely to predominate and prescribe to the others." The system of the balance of power is entirely the outgrowth of the modern political system of Europe, as it began to shape itself in the 15th century; not that it was entirely unknown to the ancients before the irresistible progress of Roman arms put any idea of balance out of the question, but these early efforts after the balance of power were not sustained for a sufficiently long period, from generation to genera-

BALANCE OF POWER

tion, from century to century; were too transitory and casual to entitle them to be elevated into a system. They must be regarded as approaches and tentatives, interesting, but in the end fugitive and unsuccessful. During the latest centuries of the Middle Ages, the kings of France and the emperors of Germany were too much engaged in their domestic struggles with their great vassals, to spare the concentrated attention and energy upon international affairs necessary to originate and sustain a system of balance in Christian Europe. In Italy, then so far in advance of the rest of Europe in intellectual, social, and political development, the princes, podestas, and republics of that peninsula, from an early period of the 15th century, had built up the institution of an equilibrium for their mutual regulation. But this was too local and on too small a scale to be deemed the parent of our modern system. Not until Louis XI. of France had repressed the Dukes of Burgundy and Brittany, not until Ferdinand of Castile and Aragon had united almost the whole of modern Spain under his sway, not until Maximilian in Germany, and Henry VII. in England and Ireland had consolidated the monarchical authority, was the time ripe for the application of this idea. The invasion of Italy by Charles VIII. of France, and his claim to the kingdom of Naples, in 1494, gave rise to the first great European combination of otherwise hostile powers for the repression of the ambition of one. Almost all the Italian states, Maximilian, the German emperor, and Ferdinand of Aragon, suspended their animosities, and drove the French out of Italy. The Emperor Charles V. of Germany, Spain, Burgundy, the Netherlands, and a vast transatlantic empire, 1519-56, caused the jealousy of Europe. Francis I. of France, actually went so far as to ally himself with the sultan, Solyman the Magnificent, against Charles. The Turks at one end of Europe, the kings of France and England at the other, and the opposition of the Protestant princes in the centre, prevented Charles from realizing his ambitious schemes. The misfortunes of Philip II, the son of Charles V., in the Dutch Netherlands and in the expeditions against England and the English power in Ireland, effectually dissipated the fears Europe entertained concerning the overgrown power of the Spanish branch of the house of Hapsburg. The idea of a European equilibrium had now become sufficiently definite for Henry IV. of France to propose to Elizabeth of England, at the commencement of the 17th century, a scheme for a federative congress, whose purpose it should be to maintain the peace of Europe in the same manner as the great powers do now. The idea was impracticable in those days, and was entirely abandoned even as a project, on the assassination of that liberal and high-minded prince. The next potentate whose power gave general alarm and caused a coalition against him in the general interest, was the emperor Ferdinand II. of Germany (reigned 1619-37). Gustavus Adolphus, of Sweden, appealing to the Protestant princes of Germany, subsidized by Richelieu, the French minister, and supplied with men by England and the united provinces of the Netherlands, achieved the task of humbling the power of the house of Austria. After the death of Gustavus, Oxenstiern of Sweden, and Richelieu of France, together forced upon

the German emperor the celebrated Treaty of Westphalia (1648), which relieved Europe from the fear of the house of Austria, and put an end to the Thirty Years' war. The next general danger came from France. The invasion by Louis of the Dutch Netherlands (1672), brought about a coalition of Holland, the emperor of Germany, the elector of Brandenburg, and the king of Spain, against the French king. William, prince of Orange, was the hero of this war; but the Peace of Nimeguen (1678) sealed the supremacy of Louis XIV. The will of the king of Spain nominating the second son of the French dauphin as his successor (1700), thus putting the powerful monarchies of France and Spain into the same hands and utterly destroying the European equilibrium, created the grand alliance and the war of the Spanish succession. The emperor of Germany, the Duke of Savoy, the king of England, and the states-general of the United Provinces, united in this grand alliance. The king of Portugal afterward joined the anti-French confederacy. Marlborough and Prince Eugene of Savoy were the great military leaders in behalf of the balance of power. The Peace of Utrecht (1713), by which the union of the French and Spanish crowns was prevented, and the territorial conquests of France almost wholly surrendered, re-established the influence of the equilibrium doctrine, and secured Europe from danger on this side until the era of the French republic. The Empress Elizabeth, of Russia, was the first Russian potentate who took part in wars in which she had only a remote general interest. Prussia and Russia, celebrated their entry into the rank of first-class powers by dealing the most terrible blow to the balance of power which it has ever suffered. The first partition of Poland (1771-72) is admitted by every writer on this subject to be at war with the fundamental principles on which the equilibrium rests. The achievement of American independence (1783), though not generally reckoned by European writers as belonging to the history of the international balance, may well be included therein, inasmuch as it put an end to the overgrowth of British colonial power and British naval preponderance. At the Congress of Vienna (1814-15), it was the leading wish of Lord Castlereagh, the British plenipotentiary, to restore the kingdom of Poland, as included in the European equilibrium, in which he was seconded by Metternich for Austria, and Talleyrand for the French legitimate sovereign, but opposed by the representatives of the Russian and Prussian monarchies. The return of Napoleon from Elba put an end to this difference, and in the renewed conferences after the battle of Waterloo, the western powers did not insist upon the point. From 1815 to 1853, the world was substantially preserved from any war of importance by the five great powers who then presided over the destinies of Europe, namely, France, Great Britain, Russia, Austria, and Prussia. In 1853, the invasion of the trans-Danubian provinces of the Turkish empire by a Russian army was declared by a congress of the great powers at Vienna to be a breach of the political equilibrium. In this declaration France, Great Britain, Austria, and Prussia agreed. An Anglo-French alliance was made (1854) to repel the aggression, and the confederation of Turkey, Great Britain, and France, was reinforced by the king of Sardinia in the spring of the year

BALANCE OF TRADE—BALANOGLOSSUS

1855. After a war of three campaigns, the Treaty of Paris was signed (30 March 1856), by which Russia abandoned her claims, and the principle of the balance of power was anew vindicated. The Congress of Berlin in 1878, acting in the interests of the balance of power, deprived Russia of many benefits gained through the Treaty of San Stefano. Within a generation, the principle of nationalism has arisen in opposition to that of the balance of power. This is exhibited in United Italy, United Germany, and the spread of Pan-Slavism in Russia, but as a set-off to this may be mentioned the extension of European influence in Asia and Africa as regards colonization and trade. Thus the balance of power has become a world question and such nations as Germany and Italy are desirous of acquiring colonies to balance the colonial possessions of Russia and England. At present the balance of power in Europe is held by the six nations of Great Britain, France, Germany, Austria, Russia, and Italy.

Balance of Trade. The so-called balance of trade is a theory arising from the apparent relation of exports to imports. The protectionist school of political economy holds that excess of exports over imports constitutes what is termed a "favorable balance," which must be returned to us in gold and silver, this being the profit to the nation on its foreign trade. According to this theory the one desirable thing in foreign commerce is the exportation of merchandise. It should be said that all protectionists do not share in a belief in this theory.

In a great measure, and in its more exaggerated form, this doctrine is a survival of the old mercantile theory, which down to the time of Adam Smith controlled most of the legislation relating to commerce, and which held that gold and silver were the only wealth. It still retains a firm hold on the popular mind, but it may be said that the full weight of the teachings of orthodox political economy is against the notion that excess of exports constitutes a favorable balance.

The argument of the latter is that if the theory is true there cannot be too great an excess of exports, and that our imports should therefore consist only of gold and silver. In this "reduction to absurdity" (since a country has no more need of an excessive supply of the metals than of any other commodity) the free-trade school of political economy rejects the conclusions based upon the apparent excess of exports over imports.

Opponents of the theory hold that such trade as exists between two countries, exclusive of what is paid as interest, rent, or tribute, must show a mutual profit, and represent to each a corresponding excess of the value of importation. For illustration: A commodity costing in one country \$75 will be bought in another for \$100, in exchange for a commodity costing \$75 in the country of its exportation and \$100 in the importing country, such difference representing the degree of desirability of these particular commodities to each country. It will be observed that this precisely reverses the "balance of trade" theory.

Countries may be able to show a favorable balance from two causes, neither of which contributes to their prosperity. It may result from an actual drain, as in the case of Ireland, which

is being sapped of its wealth by absentee landlords, and in India, where the same phenomenon is caused by a similar drain in the form of tribute, official salaries spent outside the country, pensions, etc. But in these instances it is clear that there is a condition unprofitable to both countries. Or, on the other hand, it may result, as in the United States, which has the same favorable balance, by reason of the large sums annually paid as interest on loans that entered originally into railroad building, industrial improvements, etc. Most of the royal families of Europe, not to mention less exalted individuals, draw large dividends from American investments. Money spent by American tourists abroad helps to swell this favorable balance.

For proof that this theory has no such relation to national prosperity as its friends conceive, its opponents point to England, whose commercial greatness is rivalled by this country alone, and which has a prevailing "unfavorable" balance, because she has been the money-lender of the world, and her excess of imports represents the return received by her people for moneys invested in foreign lands.

It is impossible to account for the growing increase of our own export balance wholly on the explanation that such excess is rent or interest upon loans. Much of such excess is indeed fictitious, and is to be accounted for by undervaluation of imports and overvaluation of exports. In the latter case there is a strong inducement to overvalue, in order to conceal the fact that many of our exporters are selling goods cheaper abroad than at home. The inducement to undervalue imports is quite as strong. In short, customs statistics, with every desire on the part of the treasury department to be accurate, are of necessity unreliable.

Balanga, *ba-lan'ga*, Philippines, in the province of Bataan, on the western coast of Manila Bay, in the Island of Luzon. It has a post-office and telegraph station. Pop. about 9,000.

Balani'tis, an inflammation of the mucous membrane of the foreskin. It is a common condition and is due to uncleanness. Quacks and charlatans magnify its importance, declare it to be a fearful malady, and promise miraculous cures. Ordinary cleanliness will cause a *balantis* to disappear in a few days. This cannot happen if the local trouble is of a *venereal* nature.

Balanoglossus, a worm-like marine animal, the chief representative of the most primitive class of chordate animals, *Enteropneusta* or *Adelocephala*. This remarkable creature, the type of its class, combines characters peculiar to itself, with features reminding us of the nemerteans, annelids, tunicates, and the vertebrate amphioxus, while its free-swimming larva was originally supposed to be a young echinoderm. From the fact that the central nervous system lies above a notochord, Bateson placed it next to the vertebrates.

One American species, *Balanoglossus aurantiacus*, is a long, cylindrical, soft, fleshy worm, footless, without bristles, but with a large, soft, whitish, tongue-shaped proboscis in front arising dorsally within the edge of the collar surrounding the mouth. The surface of the body is ciliated. At the beginning of the digestive

BALANTIDIUM — BALAWAT

canal is a series of sac-like folds of which the upper or dorsal portion is respiratory and separated by a constriction from the lower, which is digestive, and leads directly to the intestine behind. This pharyngeal respiratory portion of the digestive canal has on each side, in each segment, a dorsal sac, the two communicating along the median line of the body. The dorsal respiratory sacs each bear in their walls a delicate chitinous gill-support or -arch. Between the gill-arches, forming numerous lamellæ, are a series of slits, leading on each side to openings (spiracles), situated dorsally. The water passes through the mouth into each gill-sac, and out by the spiracles. The nervous system lies above a short sac regarded as a notochord. There is a dorsal blood vessel, which sends branches to the respiratory sacs, and a ventral vessel. The worm lives in sand at low-water mark from Cape Ann to Charleston, S. C., also in the Mediterranean.

The life-history of this worm is most interesting. The young, originally described under the name of *Tornaria*, was supposed to be an echinoderm larva, though it resembles the larval *Gephyrea* and *Annelida*. It is a transparent, surface-swimming, minute, ciliated, slender, somewhat bell-shaped form, with black eyespecks. When transforming to the worm condition, a pair of gills arise on sac-like outgrowths of the oesophagus, and afterward three additional pairs, with their external slits, arise, somewhat as in ascidians. The entire *Tornaria* directly transforms into the worm, the transitional period being very short. The body lengthens, the collar and proboscis develop, afterward the body lengthens, the end tapering and becoming much coiled.

Consult: A. Agassiz, 'The History of *Balanoglossus* and *Tornaria*' ('Memoirs of the American Academy of Arts and Sciences,' Vol. IX, Boston, 1873); 'The Later Stages in the Development of *Balanoglossus* Kowalevskii, etc.' ('Quarterly Journal of the Microscopical Society,' London, 1885-6.)

Balantidium, bāl-ān-tid'i-um, a genus of *Infusoria*, some members of which, notably *B. coli* have been found in the large intestine, where they cause symptoms of intestinal derangement, anæmia, peevishness, and other symptoms of an intestinal parasite. The diagnosis is made by means of the microscope. Quinine enemas, five grains to the pint, are usually curative. See **INTESTINAL PARASITES**.

Bal'anus ("acorn-shells"), a genus of sessile cirripeds, family *Balanida*, of which colonies are to be found on rocks at low water, on submerged timbers, crustaceans, shells of mollusks, etc. They differ from barnacles in having a symmetrical shell and being destitute of a flexible stalk. The shell consists of six plates with an operculum of four valves. They pass through a larval state in which they are not fixed, moving by means of swimming-feet which disappear in the final state. All the *Balanida* are hermaphrodites. A South American species (*B. psittacus*) is eaten on the coast of Chile, the *B. tintinnabulum* by the Chinese. The old Roman epicures esteemed the larger species.

Balao, ba-lā'ō, a West Indian name, among Spanish-speaking fishermen, for the half-beaks (q.v.).

Balard, ba-lār, **Antoine Jerome**, French chemist: b. Montpellier, 30 Sept. 1802; d. Paris, 31 March 1876. He was professor of chemistry at the Collège de France, Paris, and discoverer of bromine; also of a process of extracting sulphate of soda directly from sea-water. In 1868 he was made Inspector-General of Superior Instruction.

Balas Ruby, a variety of ruby spinel.

Balashov, bāl-ā-shōf', a Russian town in the government of Saratov, situated on the Don, 170 miles west of the city of Saratov. It has a considerable export trade of grain, etc. Pop. about 13,000.

Balasure, bāl-a-sōr', a city of Bengal, British India, capital of the district of Balasure. It is situated near the coast and has dry docks and a considerable coasting trade. Pop. about 20,000.

Bal'ata, bāl'a-ta, a rubber-like exudate derived from the milky juice of *Mimusops balata* and *M. schomburgkii*. The gum is used widely in the arts, and is sometimes confused with gum chicle, from which much of the chewing-gum of commerce is derived.

Balate, ba-lā'ta, the Philippine name for a kind of trepang (*Holothuria atra*).

Balatka, bālāt-ka, **Hans**, musician: b. Hoffnugsthal, Moravia, 1828. After studying music in Vienna he settled in Milwaukee, Wis., where he founded the Musikverein in 1851, which he conducted for nine years. He then removed to Chicago, where he organized the Liederkrantz, the Mozart Club, and conducted the Philharmonic Society and the Symphony Society.

Balaton, bō'lō-tōn, or **Platten See**, a lake in the southwest of Hungary, extending from lat. 46° 45' to 47° 5' N., and from lon. 17° 14' to 18° 10' E.; area about 110 square miles, or, including the marshy shores, about 138 square miles. It receives the waters of more than 30 small streams. It discharges through the Sio, which empties into the Sarviz, an affluent of the Danube. The Balaton is constantly in a state of motion, sufficient to cause waves. Its waters are perfectly transparent and abound with fine fish, notably one called *fogas*, frequently 20 pounds in weight, and with delicious flesh of snowy whiteness. Another kind, resembling the herring, swarm in the lake during the winter in such shoals that fishermen sometimes haul 50 cartloads from under the ice in a single day.

Balauang, bā-low-äng', Philippines, a town in the province of La Unión, Luzon, north of San Fernando. Pop. about 25,000.

Balau'stion's Adven'tures, a poem by Robert Browning, describing a Greek girl of Rhodes. 'Aristophanes' Apology' is a continuation of this poem.

Balawat, bā-la-wāt', a ruined city of Asiatic Turkey, 10 miles from Nimrud. Excavations there have resulted in the finding of the ruins of the palace of Shalmaneser II. The bronze gates that opened into the vestibule of this palace are especially interesting and valuable, and have been placed in the British Museum.

BALAYAN — BALBOA

Balayan, ba-la'yan, Philippines, a town of Batangas province, Luzon, situated on the Gulf of Balayan, northwest of the town of Batangas. Pop. about 25,000.

Bal'bec. See BAALBEK.

Balbi, bal'bē, **Adriano**, famous geographer: b. Venice, 25 April 1782; d. Padua, 14 March 1848. In 1808 his first work on geography procured his appointment as professor of that science in the College of San Michele, at Murano, and in 1811 he became professor of natural philosophy in the Lyceum at Fermo. Having married an actress, he went in 1820 to Portugal, where he became acquainted with the leading scholars and statesmen. He had free access to the government archives, and from the documents he collected, composed two interesting works entitled 'Essai Statistique sur le Royaume de Portugal et d'Algarve, Comparé aux Autres États de l'Europe,' and 'Variétés Politiques et Statistiques de la Monarchie Portugaise,' which he published at Paris in 1822. He followed his scientific pursuits in that metropolis, and four years later produced the first part of his 'Atlas Ethnographique du Globe, ou Classification des Peuples Anciens et Modernes d'après leurs Langues,' a work of superior arrangement, in which he spread before the French public the result of the researches and disquisitions of the German philologists. He published afterward, in concert with several scientific men, statistical tables of Russia, France, the Netherlands, etc. He now gave all his attention to his 'Abrégé de Géographie Rédigé sur un Plan Nouveau,' a summary of geographical science which appeared in 1832 and has been translated into nearly all the European languages. Then he retired to Padua, where he published, in 1835, his 'Essai sur les Bibliothèques de Vienne.' Beside the works above-cited mention may be made of 'La Monarchie Française Comparée aux Principaux États de l'Europe' (Paris, 1828); 'Balance Politique du Globe' (1828); 'L'Empire Russe Comparé aux Principaux États du Monde' (1829); 'The World Compared with the British Empire' (1830); 'Statistique Comparée de l'Instruction et du Nombre des Crimes' (1829). Balbi was also a contributor to many important publications, 'L'Encyclopédie des Gens du Monde' and 'Le Dictionnaire de la Conversation.' His works show a great amount of knowledge, thorough research, and skilful arrangement of material; but, being utterly deficient in style, they are heavy and of difficult reading; however, they may always be advantageously and safely consulted.

Bal'bi, Gasparo, Venetian dealer in precious stones, who lived in 16th century. He traveled first to Aleppo and thence down the Euphrates and Tigris to the Malabar coast, sailing finally for Pegu, where he remained two years. His 'Viaggio all' Indie Orientale,' published on his return to Venice in 1590, contains the earliest account of India beyond the Ganges.

Balbi, Giovanni, called DE JANUA or JANUENSIS, from his birthplace, Genoa, a Dominican friar, who lived toward the end of the 13th century. He composed a kind of encyclopædia, which he called the 'Catholicon.' This book owes its celebrity principally to the fact

that it has become one of the earliest monuments of the art of printing. The original edition is to be found under the title, 'Summa Grammaticalis valde Notabilis quæ Catholicon Nominatur' (Moguntia, per Johannem Faustum, 1460, fol.). It was reprinted at Augsburg, 1469 and 1472, by Schoeffer; at Nuremberg, 1483, by Koburger; at Venice, 1487, revised and improved, by Pietro Gilles.

Balbi'nus, Decimus Cælius, Roman senator and poet. After the death of the two Gordiani, killed by the soldiers of Maximinus, he was elected emperor by the Senate, concurrently with Clodius Pupienus Maximus, in opposition to the usurper Maximinus. The two emperors reigned little more than one year, and were assassinated by their soldiers 238 A.D.

Bal'bo, bal'bō, **Cesare**, Count, Italian statesman and author: b. Turin, 21 Nov. 1789; d. 3 June 1853. Through the favor of Napoleon he was appointed auditor to the French privy council in 1807, and afterward became secretary to the French commissioners charged with the organization of Tuscany and the Papal States. In 1812 he was promoted to the office of commissioner of Illyria, and after the downfall of Napoleon became secretary of the Sardinian ambassador in London until the outbreak of the Sardinian revolution in 1821, when he returned to his native town in order to devote himself to literary pursuits. He wrote a history of Italy up to the time of Charlemagne, and translated Heinrich Leo's 'Exposition of the Municipal Institutions of Lombardy,' from German into Italian, under the name of 'Comuni Italiani.' His reputation was not firmly established, however, until the latter year, when his 'Speranze d'Italia' made its appearance. His appeal in favor of a national independence found a powerful echo in the popular heart, and paved the way for the revolution in which he was destined to play a prominent part as a champion of the moderate party. His next work, printed at Bastia, in 1849, 'Della Storia d'Italia, dall' Origine Fino al 1814' (History of Italy, from the Beginning to 1814), was not only inspired by the same patriotic spirit, but also distinguished by historical merit. But although in 1848 and 1849 he had strenuously opposed the democratic party and unwaveringly adhered to a more conservative policy, he threw the entire weight of his political influence into the scale of patriotism as soon as the war against Austria began. He supported the different cabinets which governed Sardinia after the promulgation of the constitution of 4 March 1848, and, though for a very short time, was personally connected with the government. He became a regular contributor to the *Risorgimento*, a leading paper of Turin, and in it gave a constant support to D'Azeglio's administration.

Balboa, bāl-bō'a, **Vasco Nuñez**, the discoverer of the Pacific Ocean: b. Jerez de los Caballeros, Spain, 1475; d. 1517. At the age of 25 he went to America to seek his fortune, joining the expedition of Rodrigo de Bastidas (see CENTRAL AMERICA), and returned to Española, (Haiti), after exploring with Bastidas a part of the southwestern coast of the Caribbean Sea. At the town of Salvatierra in Española he became a planter, but with such indifferent success that, when he resolved to attach himself

BALBRIGGAN — BALCONY

to Alonzo de Ojeda's new colony on the mainland of South America, he found difficulty in escaping from his creditors. To elude their vigilance, he hid in a large cask, and thus was carried from his plantation to the landing, and thence on board one of Ojeda's vessels, as a part of the cargo. It is probable that when he emerged from his place of concealment he would have been handed over to the authorities on shore if the expedition had not stood in need of every available fighting-man. Admitted to membership reluctantly, and as a common soldier, Balboa showed his talent for leadership when the undertaking seemed on the point of failure. He suggested transferring the colony to Darien, describing the more favorable conditions there, as he had seen them on his previous voyage. His advice was taken, and the name Antigua (Santa Maria de la Antigua del Darien) was given to the new settlement. Here the Spaniards were somewhat more successful and Balboa assumed command.

In the year 1513 he received a letter from a commissioner whom he had sent to Spain, informing him that he might expect to be summoned to court to answer grave charges. Resolving to win back the royal favor by some striking service, he selected 190 men, the best of his soldiers, and with these and 1,000 native warriors and carriers, and a pack of bloodhounds, sailed from Antigua, 1 September 1513, following the Darien coast westward until he reached a point opposite the Gulf of San Miguel. This gulf extends far into the south coast from the Pacific, narrowing the isthmus to a width of 50 miles. Accurate information in regard to the southern coast, the ocean that lay beyond, and the superior civilization of the Incas of Peru, whose country was to be reached by way of this ocean, had been obtained from the Indians, especially through Balboa's favorite Indian mistress, Fulvia.

The march began 6 September. On the 24th reaching an elevated plateau, the Spaniards repulsed an attack by 1,000 Indians and found supplies in the village of Quarequá. The following day, 25 September 1513, Balboa gained the summit of a mountain from which the waters of Mar del Sur (southern sea) were visible. The name, Pacific, was not applied to this ocean until seven years later, when it was bestowed by Magellan. On 20 September Balboa took formal possession of the "Southern Sea" by marching into the water, and, in the names of the king and queen of Castile, claiming "these seas and lands."

The warning received from the Spanish court was justified in the event. Balboa had already been superseded by Pedrarias. The reward of the former was an empty title of Adelantado of the Southern Sea; while on shore he was made the subordinate of his rival and bitter enemy, Governor Pedrarias. Three years later a South Sea expedition was in prospect, and Balboa, instead of Pizarro, might have been the conqueror of Peru; but the governor's jealousy was aroused, and Balboa was executed at Acla.

MARRION WILCOX,
Authority on Latin-America.

Balbriggan, a watering place in County Dublin, Ireland, 21 miles north of Dublin. It is a seat of linen, cotton, calico, and stocking manufactures. The cotton stockings made here

are remarkable for fineness of texture and beauty of open work. Many women are employed in embroidering muslin.

Balbus, Lucius Cornelius, Roman officer, sometimes surnamed MAJOR, to distinguish him from his nephew (see below): b. Gades, Iberia, in the 1st century. He served his first campaign under Q. Metellus Pius and Pompey. For his conduct in this war the privileges of a Roman citizen were conferred on him, his brother, and his nephews. In 72 B.C. Balbus removed to Rome, and soon became an intimate friend of Cæsar. He was consul in 40 B.C., and is supposed to have been the first adopted citizen to fill that office. He wrote a diary of the chief events in his own and Cæsar's life, and continued Cæsar's 'Commentaries.'

Balbus, Lucius Cornelius (MINOR), nephew of the above, a Roman officer, who in acknowledgment of a victory gained in Africa, was awarded the honor of a triumph, the first ever paid to one not born in Rome.

Balch, George Beall, American rear-admiral: b. Tennessee, 3 Jan. 1821. He was appointed to the navy from Alabama 1837, was promoted passed midshipman 1843, and served through the Mexican war. He was with Commodore Conner's squadron in the first attack on Alvarado, with the mosquito fleet under Commodore Tatnall, and at the bombardment and surrender of Vera Cruz. As a lieutenant on the Plymouth he was with the Asiatic squadron 1851-5, and received a hip wound in a fight between the rebels and imperialists at Shanghai, China. During the Civil War he commanded the Pocahontas and Pawnee, taking part in numerous engagements with the Confederate batteries, chiefly in South Carolina. He became captain, 25 July 1866; commodore, 13 Aug. 1872; rear-admiral, 5 June 1878; and was retired in 1883.

Balcony, a gallery or framework of wood, iron, or stone, projecting from the front of a house, generally on a level with the floors of rooms, and supported on cantilevers or brackets, and sometimes on columns of wood or stone. Balconies are often surrounded by iron railings or stone balustrades. The etymology of the word has been frequently traced to the Greek *βαλλειν*, to throw. This rests upon the presumption that balconies were built originally for purposes of defense, the enemy being attacked with missiles thrown upon him from the balcony. The Latin word is *balcus* or *palcus*, the Italian *balcone*, also *balco* or *palco*, the Turkish *bala-khaneh*, the German *balcon*. The use of balconies is comparatively modern, although there is no doubt about their existence in times of antiquity. Winckelmann, the great German writer upon art, refers to the fact that in Greece every private dwelling-house had contrivances which, although then designated under different terms, would be called balconies in our day. In Spain, Italy, and South America, they are used for sitting, walking, chatting, and flirting, in warm summer evenings; but they are less common in northern countries, where the nature of the climate does not call for such romantic contrivances. They are, however, often used as miniature gardens for potted plants. Upon Boccaccio and Bandello, the great Italian novelists of the 16th century, the poetical utility of balconies was not lost, and entertain-

BALD CYPRESS—BALDUNG

ing balcony scenes abound in their stories. Shakespeare took his plot of Romeo and Juliet from one of Bandello's novels, and the balcony scene exhibits, with that power of genius of which the great English dramatist alone was capable, the beauty of a balcony when two young lovers like Juliet and Romeo make it the witness of their passion.

In modern theatres the term is applied to the first or second gallery or tier of seats above the pit.

Bald Cypress. See CYPRESS.

Bald Eagle, the American white-headed eagle. See EAGLE.

Bald Mountain, the name of several eminences in the United States, of which the following are the principal: (1) In Colorado, height, 11,493 feet; (2) in California, 8,295 feet; (3) in Utah, 11,975 feet; (4) in Wyoming, in the Wind River Range, 10,760 feet; and, (5) in North Carolina, 5,550 feet. The last named was the cause of much excitement in May 1878, because of inexplicable rumblings which lasted for about two weeks. The mountain shook as if in the throes of an earthquake, immense trees and rocks were hurled down its sides, and for a time fears were entertained lest a volcanic eruption should follow. A subsequent examination showed that a large section of the mountain had been split asunder, but no further disturbance occurred.

Baldachin, bäl'da-chîn. See ALTAR.

Balde, Jakob, bal'dä, yä'cöb, German Latin poet: b. Ensheim, Alsace, 1603; d. Neuburg, on the Danube, 1668. He was court-chaplain to the prince electoral of Bavaria, and distinguished himself by the excellence of his Latin poetry. Herder called attention to the beauty and genius of his lyrical productions, many of which he translated.

Balder, bäl'der, or Baldur, in Norse mythology a divinity, represented as the son of Odin and Frigga, beautiful, wise, amiable, and beloved by all the gods. His mother took an oath from every creature, and even from every inanimate object, that they would not harm Balder, but omitted the mistletoe. Balder was therefore deemed invulnerable, and the other gods in sport flung stones and shot arrows at him without harming him. But the evil god, Loki, fashioned an arrow from the mistletoe and got Balder's blind brother Hoder to shoot it, himself guiding his aim. Balder fell dead, pierced to the heart, to the deep grief of all the gods. He is believed to be a personification of the brightness and beneficence of the sun.

Balderstone, bäl'dër-stön, Caleb, the old butler of the master of Ravenswood, in Scott's 'Bride of Lammermoor.'

Baldi, bäl'dë, Benardino, Italian scholar and poet: b. 1553; d. 1617. He was an accomplished linguist and a very prolific writer, and was abbot of Guastalla for 25 years. Among his numerous works are 'Cronica dei Matematici'; 'La Nautica,' a poem on navigation; an Arabic grammar; and a translation of the 'Targum of Onkelos.'

Baldness. Under the title ALOPECIA the general types of baldness have been considered. Premature alopecia, or the general affection of the young and middle-aged, deserves greater

consideration. *Alopecia presenilis*, or premature baldness, is recognized as of two distinct varieties, the idiopathic and the symptomatic. In the idiopathic variety that occurs before the age of 45 there does not seem to be any disease of the scalp or of the general nutrition to explain it. It is a gradual and progressive loss of hair, thinner and thinner hairs replacing those that have fallen out, until the follicle will not produce hair. It is usually symmetrical, beginning at the tonsure or running back from the temples. The skin is usually left thin and hard.

In the symptomatic form some general disorder, or a definite disease of the scalp is the cause. This latter is usually a scaly dandruff; the general causes may be syphilis, tuberculosis, fevers or local destructive conditions. Dandruff (q.v.) is the most frequent accompaniment and cause of baldness. Dandruff is really at least three different diseases of the skin, but the general character is that of a general seborrheal dermatitis; that is, a mild inflammation with excessive fatty secretions. This is frequently due to digestive disturbances, and is closely dependent upon the general health of the entire body. The hair falls out as in the idiopathic form. The dandruff usually continues until the hair is gone, and then ceases.

Treatment should be begun early, particularly in those whose families have tended to baldness. The details of treatment require professional advice. The large number of hair-tonics in the market speaks well for the general inutility of all of them. Cleanliness, frequent dry-brushings, and shampoos once in every two or three weeks, are safe measures, and tend to keep up the general hygiene of the scalp. Consult Jackson, 'Diseases of the Skin' (1900). See DANDRUFF.

Baldo, Monte, a mountain in Lombardy, Italy, near Lake Garda, with an elevation at its highest peak of 7,275 feet.

Baldovinetti, bal'dō-vē-nët'të, Alessio, Florentine artist: b. 1422; d. 1499. Few of his works remain except a 'Nativity' in the Church of the Annunziato, and two altar-pieces in the gallery of the Uffizi and the Academy of Arts, Florence.

Baldpate, or Baldhead, the name of several different birds having a white head, as an eagle, one of the widgeons, a kind of domestic pigeon, a West Indian dove, a fruit-crow, etc.

Baldric, bäl'drik, a belt or sash worn over the right or left shoulder diagonally across the body, often highly decorated and enriched with gems, and used not only to sustain the sword, dagger, or horn, but also for purposes of ornament and as a military or heraldic symbol. The fashion of wearing a baldric appears to have reached its height in the 15th century. In the United States it now forms a part of the uniform of Knights Templar and other fraternal organizations.

Balducci, bäl-dö'chë, Francesco, leading Italian Anacreontic poet: b. Palermo; d. Rome, 1642. He wrote 'Sicilian Songs' in the Sicilian dialect, etc.

Baldung, bäl'dùng, Hans, or Hans Grün, German painter and wood engraver: b. Suabia, 1470; d. Strasburg, 1522. His work, though inferior to Durer's, possessed many of the same

BALDWIN

characteristics, and on this account he has been sometimes considered a pupil of the Nuremberg master. His principal paintings are the series of panels (of the date of 1516) over the altar in Freiburg Cathedral; others of his works are to be found at Berlin, Colmar, and Basel. His numerous and often fantastic engravings have the monogram H. and B., with a small G. in the centre of the H.

Baldwin I., king of Jerusalem. He was the son of Eustace, Count of Bouillon, and accompanied his brother Godfrey of Bouillon into Palestine, where he gained the sovereignty of the state of Edessa. He succeeded his brother on the throne of Jerusalem in 1100, and for 18 years waged war against the Turks, the Arabs, the Persians, and the Saracens. He took many towns and secured for the Christians the coast of Syria from the Gulf of Issus to the confines of Egypt. He died at Laris, in the desert in 1118, and was buried on Mount Calvary. In the first canto of Tasso's 'Gerusalemme Liberata,' the poet has depicted the character of this monarch as well as that of his brother, Godfrey.

Baldwin I., the first Latin emperor of Constantinople, son of Baldwin VIII., Count of Flanders and Hainault: b. Valenciennes, 1170. In 1200 he joined the crusaders with his brother, Thierry, and in 1202 aided the Venetians in their attack upon Constantinople, of which city he was crowned emperor 16 May 1204. In the next year Baldwin was taken prisoner by the king of Bulgaria, and, it is said, died in captivity in 1206. He was much esteemed by the Greeks for his charity, temperance, and justice.

Baldwin II., king of Jerusalem, son of Hugh, Count of Rethel. He was crowned in 1118, after Eustace, brother of Baldwin I., had renounced all claim to the vacant throne. In 1120 he gained a great victory over the Saracens, but in 1124 he was taken prisoner by them, and was ransomed only by giving up the city of Tyre. In 1131 he abdicated in favor of his son-in-law, Foulques of Anjou, and retired to a monastery, where he died in the same year. The military and religious order of the Templars, for the defense of the Holy Land, was instituted, it is thought, in the reign of this monarch.

Baldwin II., the last Frank emperor of Constantinople: b. 1217; d. 1273. He was the son of Pierre de Courtenay, and succeeded his brother Robert in 1228. He was twice besieged in his imperial city, and being too weak to defend his dominions, repaired to Italy to seek aid from the Pope. At the court of France Baldwin was favorably received by the king, St. Louis, to whom he presented a crown of thorns which was held by all Christendom to be the genuine relic. Baldwin, in 1239, set out for Constantinople with a body of crusaders, who, however, soon quitted him and took the route to Palestine. He succeeded, ultimately, in raising new forces in the West, and regained his capital; but in 1261 Michael Paleologus invested it and entered Constantinople on the 29th of July. Baldwin fled to Sicily, where he died in obscurity.

Baldwin III., king of Jerusalem: b. 1130; d. Antioch, 1162. He was son of Foulques of Anjou, whom he succeeded in 1142 under the

guardianship of his mother. He took Ascalon and other places; but under his reign the Christians lost Edessa. He was succeeded by his brother, Amaury I.

Baldwin IV., king of Jerusalem: d. 1185. He was son of Amaury, and succeeded to the throne on the death of his father in 1174; but as he was leprous, Raymond, Count of Tripoli, governed the kingdom for him. He afterward resigned the throne to his nephew, Baldwin V., in 1183.

Baldwin V., king of Jerusalem: b. 1178; d. 1186. He was son of Sibylla, sister of Baldwin IV., and was called to the throne when five years old. He died of poison, supposed to have been administered by his mother in order that her second husband, Guy de Lusignan, might enjoy the throne. The following year, 1187, the Christians lost Jerusalem, which was taken by Saladin.

Baldwin, Abraham, American statesman: b. Guilford, Ct., 6 Nov. 1754; d. 1807. He was graduated at Yale in 1772, and was tutor there, 1775-79. During the American Revolution he was a chaplain in the army, and, at the suggestion of General Greene, settled in Savannah, Ga., 1784, where he was admitted to the bar. His efforts as a member of the legislature secured a charter and endowment for the University of Georgia, which was established according to his own plans and ideas, and of which he became president. He took part in the Constitutional Convention of 1787; was a delegate to the Continental Congress 1785-88; member of the House of Representatives 1789-99; United States senator 1799, until his death.

Baldwin, Charles H., American naval officer: b. New York city, 3 Sept. 1822; d. 17 Nov. 1888. He entered the navy as a midshipman in 1839. Serving on the frigate Congress during the war with Mexico, he figured in several sharp encounters near Mazatlan. He commanded the steamer Clifton at the passage of Forts Jackson and St. Philip in 1862, and at the first attack on Vicksburg. He became rear-admiral in 1883, receiving the command of the Mediterranean squadron, and was retired in 1884.

Baldwin, Evelyn Briggs, arctic explorer: b. Springfield, Mo., 22 July 1862. He was graduated from Northwestern College, Naperville, Ill., and engaged chiefly in teaching until 1892, when he entered the United States Weather Bureau service. He is now an inspector-at-large of the signal corps of the United States army. He accompanied, as meteorologist, Peary's North Greenland expedition, 1893-4; joined the Wellman Polar expedition, 1898-99, as second in command, built Fort McKinley, and discovered Graham Bell Land. Securing the co-operation of Mr. William Ziegler of New York he organized and commanded the Baldwin-Ziegler expedition of 1901. He has written 'The Search for the North Pole,' 'Auroral Observations, Franz-Joseph Land,' 'Meteorological Reports of the North Greenland Expedition' (1893-4), and meteorological publications in government reports.

Baldwin, Frank D., American military officer: b. Michigan, 26 June 1842. He entered the volunteer army in 1861 and the regular army in 1866; became colonel of the 4th United

BALDWIN

States Infantry, 26 July 1901; and was promoted brigadier-general, United States army, 9 June 1902. He was awarded a Congressional medal of honor for service at the battle of Pine Tree Creek, Ga., 20 July 1864, and another for gallantry in an action against Indians in Texas. He greatly distinguished himself in the Philippines in the early part of 1902.

Baldwin, Foy Spencer, American educator: b. Charlotte, Mich., 6 July 1870. He was graduated at the Boston University in 1888; spent 1892-3 studying economics in Germany; and became professor of economics in Boston University in 1895. Among his publications is 'History of Mining Legislation in England.'

Baldwin, Henry Porter, American politician: b. Coventry, R. I., 22 Feb. 1814; d. Detroit, Mich., 31 Dec. 1892. He went to Michigan in his youth and from 1869 to 1873 was governor of the State. From 1879 to 1881 he sat in the United States Senate. He was very prominent in the affairs of the Episcopal Church in Michigan.

Baldwin, James, American author: b. Hamilton County, Ind., 15 Dec. 1841. Very largely self-taught, he was engaged in teaching from 1865 to 1887. He filled an editorial position with Harper & Bros. 1887-93, when he became editor of school books for the American Book Co. He has written: 'Story of Siegfried' (1882); 'Story of Roland' (1883); 'Six Centuries of English Poetry' (1892); 'Old Greek Stories' (1895); 'Guide to Systematic Readings in the Encyclopædia Britannica' (1895); 'The Discovery of the Old Northwest,' and compiled or edited many other works.

Baldwin, James Mark, American psychologist: b. Columbia, S. C., 12 Jan. 1861. He was educated at Princeton College, Leipsic, Berlin, and Tübingen universities; was instructor of German and French at Princeton 1886-87; professor of philosophy in Lake Forest University 1887-89, and in the University of Toronto 1889-93; and professor of psychology at Princeton University since 1893. He was vice-president of the International Congress of Psychology at London 1892; honorary president of the International Congress of Criminal Anthropology at Geneva 1896; president of the American Psychological Association 1897-98; judge of award at the World's Columbian Exposition 1893; was awarded a gold medal by the Royal Academy of Arts and Sciences of Denmark, in 1897, for the best work on the general question of social ethics; and was elected a member of the Institut International de Sociologie 1898. He is author of 'Handbook of Psychology' (2 vols., 1889-91); a translation of Ribot's 'German Psychology of To-day' (1886); 'Elements of Psychology' (1893); 'Social and Ethical Interpretations in Mental Development' (1897), etc. He was also one of the founders of the 'Psychological Review,' editor-in-chief of the 'Dictionary of Philosophy and Psychology,' and a contributor of articles on psychology to 'Johnson's Universal Cyclopædia' (1892-95).

Baldwin, John Denison, American journalist, politician, poet, and writer on archæology: b. North Stonington, Conn., 28 Sept. 1809; d. 8 July 1883. After studying law and theology he entered journalism, was long editor and

proprietor of the Worcester *Spy*, and was a member of Congress 1863-69. He wrote 'Raymond Hill, and Other Poems' (1847); 'Pre-historic Nations' (1869), and 'Ancient America' (1872).

Baldwin, Joseph G., American jurist: b. Sumter, Ala. 1815; d. 30 Sept. 1864. He was a judge of the superior court of California in 1857-63; chief justice of the State from 1863 till his death, and author of 'Party Leaders' and 'Flush Times in Alabama and Mississippi.'

Baldwin, Maurice Scollard, Canadian clergyman: b. Toronto, 21 June 1836. He was graduated at Trinity College in that city 1862; became rector of St. Luke's Church in Montreal, was dean of Montreal 1882-83; and in the last year was made Bishop of Huron. He published 'Break in the Ocean Cable' 'Life in a Look,' etc.

Baldwin, Robert, Canadian statesman: b. Toronto, 12 May 1804; d. there, 9 Dec. 1858. He began to practise law in 1825, and four years later became a member of the Assembly of Upper Canada. He was solicitor-general in 1840 and premier and attorney-general of Upper Canada 1842-43. He was long prominent as a Reform leader in Canada, but retired from office in 1851.

Baldwin, Simeon Eben, American jurist: b. New Haven, Conn., 5 Feb. 1840. He is a great-grandson of Roger Sherman, a signer of the Declaration of Independence, and great-great-grandson of President Clap, of Yale. His father was a United States senator and governor of Connecticut. Judge Baldwin graduated from Yale 1861, and from the Harvard Law School 1863. Settling in New Haven he rapidly acquired a large general practice, in which he continued until 1893. Since 1872 he has held a professorship in the Yale Law School, and since 1893 he has been an associate justice of the Connecticut supreme court of errors. As a legal writer he has a wide reputation in the United States and abroad, through his contributions to leading law journals. He is the author of 'Digest of Connecticut Reports' (2 vols. 1871-82; revision, 2 vols. 1900); 'Illustrated Cases on Railroad Law'; and 'Modern Political Institutions' (1899).

Baldwin, Stephen Livingston, American missionary: b. 1835; d. 1902. He went to China as a missionary under the auspices of the Methodist Episcopal Church, and on his return to the United States he held several pastorates. While in China he translated a large part of the Bible into Chinese, and, it is said, printed the first copy of the Bible in that language.

Baldwin, Theodore A., American military officer: b. New Jersey, 21 Dec. 1839. He entered the army as a private 3 May 1862, and served in that grade and as quartermaster-sergeant in the 19th U. S. Infantry till 31 May 1865, when he became first lieutenant. He was promoted captain 23 July 1867; major, 7th Cavalry, 5 Oct. 1887; lieutenant-colonel, 10th Cavalry, 11 Dec. 1896; and colonel, 7th Cavalry, 6 May 1899. From 6 Oct. 1898 till 31 Jan. 1899 he served as a brigadier-general of volunteers.

Baldwin, Thomas, Baptist minister: b. Norwich, Conn., 23 Dec. 1753; d. 29 Aug. 1825. His early culture was very limited; yet he acquired a reputation for scholarship. At an

early age he removed to Canaan, N. H., where, becoming converted, he joined the Baptist Church in 1781 and became one of the most energetic supporters of its tenets, and one of the ablest advocates of its civil rights. In 1782 he was licensed to preach, and in 1783 was ordained pastor of the church in Canaan, serving for seven years. In 1790 he was called to the Second Baptist Church of Boston and served there till his death. He took a prominent part in the establishment of Waterville College, Me., and of Columbian College, Washington, D. C. He was several times elected to the State legislature and was a member of the convention of 1821 to revise the Massachusetts Constitution. He published a volume in defense of Baptist tenets.

Baldwin University, a co-educational institution in Berea, O.; organized in 1846 under the auspices of the Methodist Episcopal Church; reported at the end of 1899: Professors and instructors, 23; students, 276; volumes in the library, 7,000; grounds and buildings valued at \$120,000; productive funds, \$81,000; income, \$9,000; number of graduates, 405; president, Rev. R. M. Freshwater.

Baldwinsville, N. Y., town in Onondaga County, on the Delaware, L. & W. railroad; and on the Seneca River; 12 miles from Syracuse. There is excellent water-power here and varied manufactures. The town has an academy, graded schools, and six churches. It was first settled in 1807. In 1815 it was known as Baldwin's Bridge. Pop. (1900) 2,992.

Bale, John, an English ecclesiastic: b. Suffolk, 1495. Although educated a Roman Catholic, he became a Protestant, and had to take refuge in the Netherlands. On the accession of Edward VI. he returned to England, was presented to the living of Bishop's Stoke, Southampton, and soon after was nominated Bishop of Ossory, in Ireland. Here, on preaching the reformed religion, popular fury reached such a pitch that in one tumult five of his domestics were murdered in his presence. On the accession of Mary he lay some time concealed in Dublin. After enduring many hardships he was enabled to reach Switzerland, where he remained till the death of Mary. On his return to England he contented himself with the calm enjoyment of a prebendal stall at Canterbury, where he closed his stormy life in 1563. He was so bitter a controversialist that he earned the title of "Bilious Bale." The only work which has given him distinction among authors is his *Scriptorium Illustrium Majoris Britanniæ Catalogus*; or *'An Account of the Lives of Eminent Writers of Britain.'* This account, which, according to the title, commences with Japhet the son of Noah, reaches to the year 1557, at which time the author was an exile on the Continent. It is compiled from various writers, but chiefly from the antiquary Leland.

Bâle, bâl. See BASEL.

Bale-fire, in its older and strict meaning, any great fire kindled in the open air, or, in a special sense, the fire of a funeral pile. It has frequently been used as synonymous with beacon-fire, or a fire kindled as a signal, Sir Walter Scott having apparently been the first to employ it in this sense; and it has at various times,

with even less reason, been confounded with "bale" in the sense of evil or fatal.

Baleáric (bäl-ē-är'ik) Crane. See CRANE.

Bal'earic Islands, a group of five islands, southeast of Spain, including Majorca, Minorca, Iviza, and Formentera. The popular derivation of the ancient name *Baleares* (Greek *ballein*, to throw), has reference to the reputed of the inhabitants for their skill in slinging, in which they distinguished themselves both in the army of Hannibal and under the Romans, by whom the islands were annexed in 123 B.C. After being taken by the Vandals under Genserich, and in the 8th century by the Moors, they were taken by James I., king of Aragon, 1220-34, and constituted a kingdom which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1,860 square miles. Pop. (1897) 306,926.

Baléchou, ba-lā-shoo, Jean Jacques Nicolas, celebrated French engraver: b. Arles, 1715; d. Avignon, 18 Aug. 1765. His full-length portrait of Augustus, king of Poland, has been proclaimed the masterpiece of the kind in the 18th century. But Baléchou dishonestly sold the best proofs for his own benefit, and was consequently expelled from the Academy of Fine Arts.

Baleen'. See WHALEBONE.

Baleen Whales, the group of whales whose mouths are furnished with a growth of baleen or whalebone (q.v.). They form a sub-order *Mysticeti* of the *Cetacea*, which includes the families *Balanopteridæ* or rorquals, and *Balaenidæ*, the right whales. These whales are known in all oceans and form an important object of the chase. See HUMPBACK; RIGHT WHALE; RORQUAL; WHALE; etc.

Bal'er, Philippines, a town in the northeast part of Luzon. The population is several thousand, mostly natives. The most conspicuous edifice is a native Catholic church. The town is noted for the heroic defense of a Spanish garrison in 1899, during a siege by the Filipinos, lasting 11 months. The Spaniards were commanded by Lieut. Saturnino Martin Cerezo, who refused to surrender the town, even when directed to do so by his superiors in Manila. He entrenched himself in the church and heroically resisted the besiegers until his supplies gave out, when he surrendered with all the honors of war, July 2, 1899. Baler was occupied by the American troops and garrisoned with two companies of the 34th Volunteer Infantry, under Major Shunk, in March 1900.

Bales, Peter, a famous English calligrapher: b. 1547; d. about 1610. His skill in micrography is referred to by Holinshed and Evelyn. He was one of the early inventors of shorthand, and is said to have been employed to imitate signatures by Secretary Walsingham.

Balestier, bäl-ēs-tēr', Charles Wolcott, American novelist: b. Rochester, N. Y., 13 Dec. 1861; d. 6 Dec. 1891. He studied at Cornell University, and became connected with a New York publishing house. His writings, which deal largely with frontier life in Colorado, include *'The Naulahka'*, written in collaboration with Rudyard Kipling, his brother-in-law; *'Benefits Forgot'* (1892), and a *'Life of James G. Blaine.'*

BALESTRA — BALFOUR

Balestra, ba-lës'tra, **Antonio**, an Italian painter: b. Verona, 1666; d. there, 21 April 1740. He became a pupil of Belucci, in Venice, and subsequently studied in Rome under Carlo Maratti. He executed the 'Defeat of the Giants,' which took the prize at the Academy of St. Luke in 1694. In 1695 he left Rome for Venice, where he became the head of a school, and counted many distinguished names among his pupils. His works are found in many of the galleries and churches of northern Italy. Among his paintings are 'Saint Theresa,' at Bergamo, a 'Virgin,' at Mantua; and a portrait of himself, at Florence. He was among the last of the Venetian school of artists.

Balfe, bäl'f, **Michael William**, British composer: b. Dublin, 15 May 1808; d. 20 Oct. 1870. He received his first instructions in music from his father and Charles Horn. In his 7th year he performed one of Viotti's concertos before the public; at 16 he performed the part of the Wicked Huntsman in 'Der Freischütz' at Drury Lane. In 1825 he went to Italy, wrote the music for a ballet, 'La Peyrouse,' for the Scala at Naples, and in the following year fulfilled an engagement to sing at the Théâtre-Italien, Paris, with moderate success. He returned to Italy, and at Palermo (1830) his first opera, 'I Rivali,' was produced. For five years, with somewhat careless haste, he continued singing and composing sundry operas for the Italian stage, which are now forgotten. In 1835 he came to England and had his 'Siege of Rochelle' brought out at Drury Lane. It hit the popular taste, and was quickly followed by others equally successful in this respect. Part of this success was no doubt due to the great artists who took the leading characters, Malibran, Grisi, Lablache, Rubini, and other stars of that time; but the works had high merits of their own, being marked by brilliancy, melody, and fertility of invention. In 1846 he was appointed conductor of the London Italian Opera. If Balfe was wanting in depth and dramatic force, he had a very thorough knowledge of effects and command of orchestral resources; and his compositions are distinguished by fluency, facility, and melodic power. His operas continue popular in England and elsewhere, among the chief being 'The Bohemian Girl' (the most popular of all), 'The Rose of Castile'; 'The Daughter of St. Mark'; and 'Satanella.' His posthumous opera, 'The Talisman,' was brought out in London in June 1874, with great success.

Balfour, bäl'foor, or bäl'fer, **Alexander**, Scottish novelist and poet: b. Monikie, 1 March 1767; d. 12 Sept. 1829. He was a frequent contributor to periodicals, and was author of 'Campbell; or the Scottish Probationer' (1819); 'Contemplations, and Other Poems' (1820); 'Farmer's Three Daughters' (1822); 'The Foundling of Glenthorn; or the Smugler's Cave' (1823); 'Highland Mary' (1827), etc.

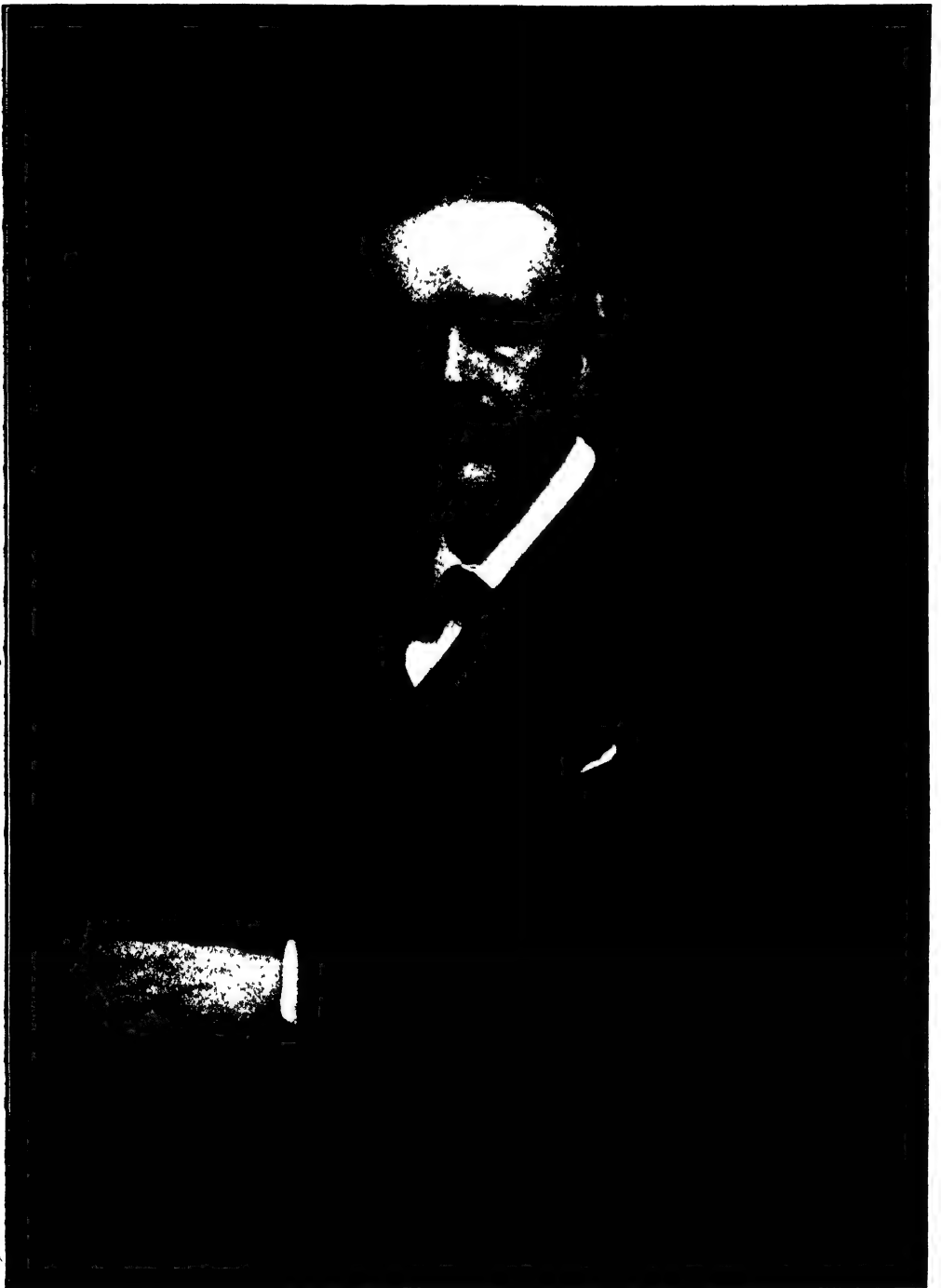
Balfour, Sir **Andrew**, Scottish botanist and physician: b. Fifeshire, 1630; d. 1694. After completing his studies at St. Andrews and London, and traveling on the Continent, he settled at Edinburgh, where he planned, with Sir Robert Sibbald, the Royal College of Physicians, and was elected its first president. Shortly before his death he laid the foundation of a hospital in Edinburgh, which, though at

first narrow and confined, expanded into the Royal Infirmary. His familiar 'Letters' were published in 1700.

Balfour, Right Hon. **Arthur James**, English statesman: b. Scotland (son of Mr. Balfour of Whittinghame, Haddingtonshire, and a daughter of the second Marquis of Salisbury) 25 July 1848. He was educated at Eton and Trinity College, Cambridge, where he took his M.A. degree in 1873. He entered Parliament in 1874, sitting for Hertford from that time till 1885, since which he has represented East Manchester. He acted as private secretary to his uncle the Marquis of Salisbury at the Foreign Office during the period to which the Berlin Treaty belongs (1878-80), and accompanied him to Berlin. He was president of the Local Government Board from June 1885 till the beginning of the following year, and from July 1886 till March 1887 he discharged the duties of secretary for Scotland. He showed much ability as chief secretary for Ireland 1887-91, passing the Crimes Act and the Law Act, securing a free grant for railways, and creating the Congested Districts Board, but resigned this post in order to succeed Mr. W. H. Smith, who had lately died, as leader of the House of Commons and first lord of the treasury. On the defeat of the Unionist party at the general election in 1892 he relinquished this office, but returned to it when the Unionists again came into power in the autumn of 1895. On the resignation of Lord Salisbury 12 July 1902 Mr. Balfour became prime minister. In 1886 he was elected lord rector of St. Andrews University, in 1890 the Glasgow students did him similar honor and in 1888 he became a Fellow of the Royal Society. The biometallists found in him a supporter and he acted as chairman of the commission on the subject in 1887. He is an enthusiastic golfer, and contributed to the volume on golf in the Badminton Series. In 1879 he published 'A Defense of Philosophic Doubt'; in 1893 a volume of 'Essays and Addresses'; and in 1895 'The Foundations of Belief, being Notes Introductory to the Study of Theology.'

Balfour, Francis Maitland, embryologist: brother of the foregoing, b. 1851. He studied at Harrow and Trinity College, Cambridge. Articles on his special study gained him a high reputation while still an undergraduate, and after further work at Naples he published in 1874, in conjunction with Dr. M. Foster, 'Elements of Embryology, a valuable contribution to the literature of biology. He was elected a fellow of his college; fellow and member of council of the Royal Society; lecturer on, and finally, in 1882, professor of, animal morphology at Cambridge, a chair specially instituted for him. The promise of his chief work, 'Comparative Embryology' (1880-1) was unfulfilled, as 19 July 1882 he was killed by a fall on Mont Blanc.

Balfour, Right Hon. **Gerald William**, English statesman: b. 1853 (brother to the two preceding). He was educated at Eton and Trinity College, Cambridge, entered Parliament in 1885, and became chief secretary for Ireland in the Unionist ministry of 1895. In this capacity it fell to him to pilot the important Irish Local Government Bill of 1898 through the House of Commons.



ARTHUR J. BALFOUR.

BALFOUR—BALILING

Balfour, Isaac Bayley, Scottish botanist: b. Edinburgh, 31 March 1853. He was professor of botany in the University of Glasgow 1879-84, at Oxford University 1884-88, and since 1888 at the University of Edinburgh. He explored the island of Socotra in 1880, in behalf of the British Association and of the Royal Society of Edinburgh. He is King's botanist in Scotland and keeper of the Royal Botanic Garden in Edinburgh.

Balfour, Sir James, Scottish lawyer, and a conspicuous actor in the civil wars which ended in the dethronement of Mary, Queen of Scots: b. Fifeshire, Scotland, about the beginning of the 16th century; d. 1583. Originally brought up in the Roman Catholic Church, he had espoused the Protestant cause, and in 1547, for his share in the conspiracy against Cardinal Beaton, he was, with Knox and other reformers condemned to the galleys. After his escape and return to Scotland, the cause of Protestantism was apparently declining, and Balfour abjured his heresies and returned to his former faith. His abilities and tact gained him appointments and he was high in office on the arrival of Mary in Scotland, and was with the queen at Holyrood on the night of Rizzio's assassination. Popular rumor assigned to Balfour a prominent share in the murder of Lord Darnley, Mary's husband, but he contrived to outlive all suspicion. In 1567 he was appointed captain of Edinburgh castle. A change in Balfour's convictions was forced upon him, for he saw that a powerful party had been formed against Mary and the policy of an alliance with them overcame all scruples. He held the castle of Edinburgh against the queen, and was the means of delivering up Mary's letters into the hands of her enemies. He afterward surrendered the castle for various considerations. On the breaking out of the civil war Balfour sided with the regent Murray, but after Mary's imprisonment in England he took part in conspiracies for her restoration, although at the time professing adherence to the regents Murray and Morton. His last public act was furnishing the evidence of Morton's guilt in the murder of Darnley, for which Morton was condemned and executed. The 'Practicks of Scots Law' attributed to him, continued to be used and consulted in manuscript for nearly a century until it was supplanted by the 'Institutes of Lord Stair.'

Balfour, James, Canadian architect: b. Hamilton, Ont., 1852. He acquired his education in Canada and Edinburgh and began the practice of his profession in his native city. Among notable buildings of his designing are the Boys' Home and City Hall, in Hamilton; Alma Ladies' College, St. Thomas; and the Museum of Art, Detroit, Mich.

Balfour, John (OF KINLOCK, OR OF BURLEY), one of the chief actors in the assassination of Archbishop Sharp in 1679, for which his estate was forfeited and a price set on his head. He fought at Drumclog and Bothwell Bridge, and is said afterward to have escaped to Holland. According to one account he died on a homeward voyage to Scotland; by another he never left the country, but settled in the parish of Roseneath, Dumbartonshire. He is described by Scott in 'Old Mortality.' Balfour of Kinlock is quite a different personage from Lord

Balfour of Burleigh, who succeeded to the title in 1663, spent his youth in France, and died in 1688.

Balfour, John Hutton, Scotch botanist: b. Edinburgh, 15 Sept. 1808; d. 11 Feb. 1884. He graduated at Edinburgh University in arts and in medicine, in 1841-5 was professor of botany in Glasgow University; and in the latter year removed to Edinburgh to occupy a similar post, resigning his chair in 1879. He wrote valuable botanical text-books, including 'Elements,' 'Outlines,' 'Manual,' and 'Class-book,' beside various other works.

Balfour, Nesbit, British military officer: b. Dunbog, Scotland, 1743; d. same place, October 1823. He was promoted lieutenant-general 1798 and general 1803; distinguished himself during the American Revolution; was wounded in the battle of Bunker Hill; fought at the battles of Elizabethtown, Brandywine, Germantown, and Long Island; and was present at the capture of New York. He was appointed commandant at Charlestown in 1779.

Balfrush, bāl-frōōsh', or **Barfurush** ('mart of burdens'), a town in the Persian province of Mazanderan, on the river Bhawal, 12 miles from the Caspian Sea. Balfrush is a centre of trade between Russia and Persia, exporting large quantities of silk, rice, and cotton, while the Russians supply iron and naphtha. It has excellent bazaars, numerous caravanserais, and several Mohammedan colleges. Pop. about 50,000.

Balg, bālg, **Gerhard Hubert**, philologist: b. Scandinavia, about 1850. He graduated at the University of Wisconsin, and resides at Mayville, in that State. He has translated W. Braune's 'Gothic Grammar, with Selections and Glossary' (1883); edited 'The First Germanic Bible, and Other Remains of the Gothic Language with Introduction and Glossary' (1891); and compiled 'A Comparative Glossary of the Gothic Language, with Especial Reference to English and German' (1887-9).

Bali, ba'lē, or **Bally**, an island of the Indian Archipelago, belonging to Holland, and lying east of Java. Its greatest length is 85 miles; breadth, 55 miles; area, about 2,260 square miles. It consists chiefly of a series of volcanic mountains, of which the loftiest, Agoong (11,326 feet), became active in 1843 after a long period of quiescence. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mostly Brahmans in religion. It is divided into eight provinces under native rajahs, and forms one colony with Lombok, the united population being estimated, in 1897, at 1,044,757.

Balikesri, bā-lē-kēs'rē, **Balu-kissar**, or **Balik-Shehr**, a town of Anatolia, 75 miles southwest from Brusa. It is built of unburnt bricks and contains the tomb of a celebrated Mohammedan saint and a manufactory of felt cloth for military clothing. It has considerable trade in silk fabrics. Pop. over 12,000.

Ba'liling, a principality of the island of Bali; pop. 130,000. The exports are rice and bullocks, and the chief trade is with the Bughis of Celebes. In 1847 the Dutch were signally defeated in an attack upon the fort of Djaga Raga in this principality.

BALINAG — BALKAN PENINSULA

Balinag, ba-le-nag', Philippines, a town of the province of Bulacan, Luzon. Pop. (1898) 14,122.

Baliol, bā'li-ōl, **Edward**, a king of Scotland, son of John Baliol of Scotland; d. Doncaster, 1363. In 1322 he made a successful invasion of Scotland and on 24 September of that year was crowned king of Scotland at Scone. Having privately rendered homage to Edward III. of England, he was routed by a party of Scottish nobles and dispossessed of his crown after a reign of three months. He regained it the next year, but was henceforth an instrument of Edward.

Baliol, or **Balliol**, **John**, king of Scotland: b. about 1249; d. 1315. On the death of Princess Margaret of Norway, grandchild of Alexander III., in 1290, Baliol claimed the vacant throne by virtue of his descent from David, Earl of Huntingdon, brother to William the Lion, king of Scotland. Robert Bruce (grandfather of the king) opposed Baliol; but Edward I.'s decision was in favor of Baliol, who did homage to him for the kingdom, 20 Nov. 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but, after the defeat at Dunbar, he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but, by the intercession of the Pope in 1297, obtained liberty to retire to his Norman estates, where he died.

Baliol, or **Balliol**, **John**, father of King John Baliol, an English baron in the reign of Henry III.: d. 1269. In 1263 he laid the foundation of Balliol College (q.v.), Oxford, which was completed by his widow, Devorgilla or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, by Margaret, eldest daughter of David, Earl of Huntingdon, brother of William the Lion. It was on the strength of this genealogy that his son, John Baliol, became temporary king of Scotland.

Baliol, **Martha Bethune**, the imaginary narrator of several of Sir Walter Scott's 'Chronicles of the Canongate.'

Baliol College. See BALLIOL COLLEGE

Balisarda, ba-lē-sār'da, a magic sword in Ariosto's 'Orlando Furioso,' stolen from Orlando by Brunello, and afterward given to Rogero.

Balisaur, bāl-ī-sā'oor (Hindu, *balloosoor*), the sand-badger of India, called by Hindus the pig-like badger or "sand-hog," on account of its long snout. See SAND-BADGER.

Balis'ta, or **Ballista**, a machine used in military operations by the ancients for hurling heavy missiles, thus serving in some degree the purpose of the modern cannon. The motive power appears to have been obtained by the torsion of ropes, fibres, catgut, or hair. They are said to have sometimes had an effective range of a quarter of a mile, and to have thrown stones weighing as much as 300 pounds. *Balis'ta* differed from *catapulta*, in that the latter were used for throwing darts.

Balize, ba-lēz'. See BELIZE.

Balkan bāl-kān', or bāl'kān, **Mountains**, (anciently called *Hæmus*), a lofty and rugged mountain range, extending from Cape Emineh Burum on the Black Sea, in eastern Roumelia, in a westerly direction to the borders of Servia, and forming the southern boundary of the basin of the Danube. In the west it is connected with the much ramified mountain-system of the south-eastern peninsula of Europe. Its length is over 200 miles; the average elevation is about 3,000 feet, but the group of the Khoja Balkans in the west have a mean height of 6,500 feet. The highest summit is Jumrukchal, 7,786 feet. The Balkan forms the watershed between the streams flowing northward into the Danube, and those flowing southward to the Ægean. The chief of the latter is the Maritza. The range, which has a gradual descent on the north, presents on the south a somewhat steep escarpment, and has always been considered the greatest natural bulwark of the Ottoman empire against enemies on the European frontiers. Yet in the Russo-Turkish war of 1877-8 the Russian troops managed to cross it without any great difficulty, although they had to encounter a stubborn resistance at Shipka Pass (4,370 feet). Here a Turkish army of 32,000 men surrendered to the Russians. The range now forms the southern frontier of Bulgaria, dividing it from eastern Rumelia. The whole of the southeastern peninsula of Europe is known as the Balkan Peninsula.

Balkan Peninsula, a region thus named after the Balkan (Turkish "high ridge"), the ancient *Hæmus* (Greek *ὁ Ἄλπος*) an important mountain range in southeastern Europe. It is the southeasternmost of the three great southern peninsulas of Europe, each of which is named after the central mountain system forming its backbone; namely, the Tyrenean, the Apennine, and the Balkan peninsulas. The northern boundary of the latter is not as clearly defined as that of the other two great peninsulas separated from central Europe by the gigantic mountain barriers of the Pyrenees and the Alps. Assuming that rivers also form a natural boundary, the Balkan Peninsula ends on the right bank of the Danube and her tributaries, the Save and the Una; it is bounded on the west by the Adriatic and the Ionian seas, on the east by the Black or Euxine and the Ægean. In a broader designation, however, the northern boundary is assumed to be the parallel of 45° N., adding to the peninsula more than one half of Rumania (Wallachia and Dobrudja) and a part of Austria (Dalmatia and a section of Croatia). Excluding the territory between 45° N. and the Danube, the peninsula comprises an area of about 175,000 square miles, which contains European Turkey proper with Novibazar, a Turkish district under Austrian military control. Bosnia, and Herzegovina (temporarily occupied by Austria; Montenegro, Servia, Bulgaria, an autonomous and tributary principality, with eastern Rumelia, under the suzerainty of Turkey and Greece. No other country in Europe is so richly provided with gulfs and excellent harbors of commercial and naval strategic value. An archipelago of numberless islands, the Cyclades and Sporades of ancient fame, forms a continuous bridge between the Balkan Peninsula and Asia Minor. The Black Sea is connected with the Sea of Marmora through the Bosphorus,

BALKH

a channel about 20 miles long, and so narrow that Constantinople, at the southwest extremity of the Thracian Bosphorus, is but one mile distant from the Asiatic city of Scutari, eastward across the Bosphorus. The Sea of Marmora is linked with the Ægean by the Dardanelles with an average width between three and four miles. The Balkan Mountains, a continuation of the Carpathian Mountain system, extend in a varied formation from the Adriatic to the Euxine, breaking up in their advance eastward into several parallel chains with many more or less, strong spurs north and south; several ranges extend southward almost to the Ægean: the Perim Dagh and the ancient Rhodope Mountains or Despoto Dagh. They are frequently broken by defiles or passes of a different degrees of serviceableness as routes. The principal passes are the Nadir-Derbend, Karnabad, the Basardshik-Sophia, the Trajan, Rosalitha, and Shipka, the latter famed by the heroic struggles between the Russians and Turks in 1877. The principal range of the Balkans is thus divided into several sections, like the Etropol, Kodja, and Shipka Balkans, and forms the boundary between Bulgaria and Rumelia. The main elevation of the chain is from 4,000 to 5,000 feet, but it rises much higher in various parts, the loftiest elevation of 9,700 feet above sea-level being reached by Mount Scargus in the Char Dagh. The Balkans are rich in minerals, especially rock salt, lead, iron-ore, copper, silver, but the treasures of the soil are yet very imperfectly known in spite of the geological researches, undertaken by German, French, and other travelers and scientists. The mountains are mostly of a granite formation, but the mountain system is very complicated, and its geologic and geostatic connections are hard to determine. There are numerous thermal and sulphurous springs, some of which are renowned and utilized as sanitary watering places. The mountains form the watershed separating the tributaries of the lower Danube and those of the Vardar and Maritza rivers, or, in other words, the watershed between the Black Sea and the Ægean. On account of the broken and irregular character of the peninsula the rivers are short and little navigable. The westernmost section of Turkey, Albania, separated from Montenegro and Novibazar by the North Albanian Alps, is a mass of parallel mountain ranges, irregularly traversed by the winding rivers, Boyana, Drin, Loum, Voitza, and Arta, which flow into the Adriatic and Ionian seas. In the Turkish provinces of Scutari, Monastir, and Saloniki, there are a number of large and deep lakes, pre-eminently those of Scutari, Ochrida, Janina, Prespa, and Kastoria. The climate of the peninsula is exceedingly varied; it is rigorous with heavy snowfalls in the north and in the central plateau between Serajevo (Bosnia) and Sofia (Bulgaria), and the tableland of Janina, but becomes mild and sunny toward the south and east, tempered by the breezes of the Ægean. There is hardly any country in the world inhabited by such a number of different peoples as the Balkan Peninsula. Surviving there are all the races recorded at the beginning of history, with their national languages and distinct racial consciousness. They do not form, however, the whole people or even the great majority of their particular race in any one district, but are intermingled and live side

by side, without ever blending together, so that the process of disentangling their various and conflicting aspirations, tendencies, and racial as well as religious distinctions, is well-nigh impossible. In eastern Rumelia (ancient Thrace) and Macedonia, there may be found a Greek, a Bulgarian, a Turkish, an Albanian village side by side. The Greeks or Byzantines, the Daco-Rumanians, who speak a distinctly Romance or neo-Latin language, and proudly derive their origin from the legionaries of Emperor Trajanus stationed in Dacia, yet undoubtedly from Dacian or Thracian mothers,—and the Albanians of Illyrian stock are the most ancient historic races of the Balkans. The Slavs are late-comers by migration and conquest. They became neither Greek nor Roman in speech or customs, political character or national proclivities, but remained distinctive in language and racial characteristics. At periods historically well determined, after the Gothic invaders in those regions had been defeated or absorbed or started on their world-stirring career, after the Turanian Avars had lost their overwhelming power, the Slavic tribes moved in great numbers into central and southeastern Europe. About 630 A.D. the Croats began to occupy the present Croatia, Slavonia, northern Bosnia. In 640 the Servians of the same race and language conquered the Avars and peopled Servia, South Bosnia, Dalmatia, Montenegro, whose inhabitants are pure Serbs in blood and language, only deriving their name from their national hero, Ivo the Black (Tsernoi), who gave the name of Tsernogora (Montenegro) to those desert rocks, a safe retreat to the Servians, after their defeat at Kossovo in 1389 inflicted by the Turks. The ethnic situation of to-day dates from that epoch. The origin of the Bulgarians is not quite clear. They appear to be of Finnish-Ugrian stock, and therefore related to the Turks and the Hungarians, but were Slavized early in history. The great apostles of the Slavs, Methodius and Cyrillus, themselves Bulgarians, even brought Byzantine culture and the Greek-orthodox religion to the other Slavic races on the peninsula. The battle of Kossovo, already mentioned, made an end to the independence of the highly developed Slavic States, and with the fall of Constantinople in 1453, the last bulwark of the crumbling Byzantine empire, the Turkish sway over the entire Balkan Peninsula became a reality. Four centuries of racial strife between the Turkish conquerors and the various Greek, Rumanian, and Slavic races under their sway ended in the formation of the Danube States and the Hellenic kingdom, more or less according to races and nationalities, so far as this was possible at all in the case of peoples which are at least as far removed in sympathy and political aspirations from one another as they are from the Turks. The racial antagonisms are grievously accentuated in the attempted solutions of racial, political, and religious problems. HERMANN SCHOENFELD, *Columbian University, Washington, D. C.*

Balkh, bälkh, a district of Afghan Turkestan. It corresponds to ancient Bactria, and is bounded on the north by the river Oxus, on the east by Badakhshan, on the south by the Hindu Kush, and west by the desert. Its length is 250 miles; its breadth, 120. Its situation was once important during the overland commerce between Indian and eastern Europe before the

BALKH — BALLAD

sea route by the Cape of Good Hope was followed. The soil has the general characteristics of a desert land; only a few parts are made fertile by artificial irrigation; and such are the vicissitudes of climate that where grapes and apricots ripen in summer, and the mulberry-tree permits the cultivation of silk, in winter the frost is intense and the snow lies deep on the ground. The natives are Uzbeks, whose character differs in different districts.

Balkh, the capital of the district of the same name, situated in a district intersected by canals and ditches. It is surrounded by a mud wall; but though bearing the imposing title of "Mother of Cities," it has not in recent times had any of the grandeur of ancient Bactra, on the site of which it is built. It was twice destroyed by Genghis Khan and Timur. A terrible outbreak of cholera in 1877 caused the capital of Afghanistan Turkestan to be transferred to Mazar, west of Balkh; since which Balkh has been an insignificant village.

Balkhash, bāl-kash', a great inland lake, near the eastern border of Russian Central Asia. Lying about 780 feet above sea-level, it extends 323 miles west-southwest, its breadth at the west end is 50 miles; at the east from 9 to 4 miles; the area is 8,400 square miles. The water is clear but intensely salt. Its principal feeder is the river Il. It has no outlet. The northern edge is well defined; but the south shores of the lake are labyrinths of islands, peninsulas, low sandhills, and strips of shallow water. Here grow masses of enormously tall reeds in which wild swine shelter. To the south, stretching toward the base of the Ala-tau Mountains, is a vast steppe almost devoid of vegetation. Balkhash seems to have at one time included in its immense area the smaller lakes Sossik-kul and Ala-kul, now far to the southeast.

Bal'kis, the Arabian name of the queen of Sheba who visited Solomon. She is the central figure of innumerable Eastern legends and tales.

Ball, Ephraim, American inventor. b. Greentown, O., 12 Aug 1812; d. Canton, O., 1 Jan. 1872. He was brought up as a carpenter, but in 1840 he established a foundry for making plow castings; invented a plow, a turn-top stove, the Ohio mower, the World mower and reaper, and the New American harvester; and for many years before his death was president of an extensive manufacturing plant at Canton, Ohio.

Ball, John, English priest of the 14th century. He was a disciple of Wycliffe, upon whose religious doctrines he engrafted some political theories resembling the "liberty, equality, and fraternity" of later ages. He was intimately concerned in the Wat Tyler insurrection of 1381, and for his part in the affair was executed at St. Albans, 15 July 1381. See Morris, 'The Dream of John Ball.'

Ball, Sir Robert Stawell, distinguished English astronomer: b. Dublin, 1 July 1840. In 1865 he was appointed Lord Rosse's astronomer at Parsonstown. He has held many posts in connection with astronomy and mathematics, including those of professor of applied mathematics and mechanism at the Royal College of Science for Ireland; Andrews professor of astronomy in the University of Dublin; astrono-

mer-royal of Ireland; and Lowdean professor of astronomy and geometry in the University of Cambridge. The Royal Society elected him a Fellow in 1873, and in 1886 he was knighted. His numerous works include: 'The Story of the Heavens' (1885); 'Time and Tide' (1889); 'Star-Land' (1889); 'The Story of the Sun' (1893); 'Great Astronomers' (1895); 'A Treatise on the Theory of Screws' (1900); 'The Earth's Beginning' (1901).

Ball, Thomas, American sculptor: b. Charlestown, Mass., 3 June 1819. He studied in Italy; engaged in painting, 1840-52; adopted sculpture exclusively in 1851; resided in Florence, Italy, 1865-97; and afterward in Montclair, N. J. His best-known works are the equestrian statue of Washington in Boston; the Webster statue in Central Park, New York; and 'Emancipation' in Washington, D. C. He published 'My Threescore Years and Ten, an Autobiography' (1891).

Ball, as an article of ammunition, see GUNNERY; ORDNANCE; PROJECTILES; SHOT.

As an implement of sport, see BASE-BALL; BASKET-BALL; CRICKET; FOOT-BALL; HAND-BALL; etc.

Ball and Socket, a joint used in machinery and piping. It consists of a spherical end of a rod or pipe fitting into a hollow sphere of the same size on a like piece. The object of this joint is to provide a close, movable connection, and to prevent leakage in pipes.

Ball Bearing, a mechanical bearing, consisting of a cup against the inner circumference of which steel balls are placed. A cone fitted to the steel bears against these balls. It is used to a great extent in bicycles and light carriage wheels, and to a less extent in light machinery and wagon bearings. Its object is to reduce friction and the use of lubricants.

Ball Clay. See CLAY.

Ball Cock, a self-acting stop-cock, opened and shut by means of a hollow metallic sphere attached to the end of a lever connected with the cock. Its use is principally to regulate the supply of water to cisterns. The ball floats by reason of its buoyancy, and rising and sinking as the water rises and sinks, shuts off the water in the one case and lets it on in the other.

Ball Flower, an architectural ornament resembling a ball placed in a circular flower, the three petals of which form a cup around it; usually inserted in a hollow molding, and generally characteristic of the Decorated Gothic style of the 14th century.

Ball Nozzle. See HYDRODYNAMICS.

Ballad, a narrative in lyric form, with no traces of individual authorship, and preserved mainly by oral tradition. In its earliest stages it was meant to be sung by a crowd, and got its name from the dance to which it furnished the sole musical accompaniment. In these primitive communities the ballad was doubtless chanted by the entire folk in festivals mainly of a religious character. Explorers still meet something of the sort in savage tribes; and children's games preserve among us some relics of this protoplasmic form of verse-making, in which the single poet or artist was practically unknown,

BALLAD

and spontaneous, improvised verses arose out of the occasion itself; in which the whole community took part; and in which the beat of foot,—along with the gesture which expressed narrative elements of the song,—was inseparable from the words and the melody. This native growth of song, in which the chorus or refrain, the dance of a festal multitude, and the spontaneous nature of the words, were vital conditions, gradually faded away before the advance of cultivated verse and the vigor of production in what one may call poetry of the schools. Very early in the history of the ballad a demand for more art must have called out or at least emphasized the artist, the poet, who chanted new verses while the throng kept up the refrain or burden. Moreover, as interest was concentrated upon the words or story, people began to feel that both dance and melody were separable if not alien features; and thus they demanded the composed and recited ballad, to the harm and ultimate ruin of that spontaneous song for the festal, dancing crowd. Events of interest were sung in almost contemporary and entirely improvised verse; and the resulting ballads, carried over the borders of their community and passed down from generation to generation, served as newspaper to their own times and as chronicle to posterity. It is the kind of song to which Tacitus bears witness as the sole form of history among the early Germans; and it is evident that such a stock of ballads must have furnished considerable raw material to the epic. Ballads, in whatever original shape, went to the making of the English 'Beowulf,' and of the German 'Nibelungenlied.' Moreover, a study of dramatic poetry leads one back to similar communal origins. What is loosely called a "chorus,"—originally, as the name implies, a dance, out of which older forms of the drama were developed,—could be traced back to identity with primitive forms of the ballad. The purely lyrical ballad, even, the *chanson* of the people, so rare in English but so abundant among other races, is evidently a growth from the same root.

If, now, we assume for this root the name of communal poem, and if we bear in mind the dominant importance of the individual, the artist, in advancing stages of poetry, it is easy to understand why for civilized and lettered communities the ballad has ceased to have any vitality whatever. Under modern conditions the making of ballads is a closed account. For our times poetry means something written by a poet, and not something sung more or less spontaneously by a dancing throng. Indeed, paper and ink, the agents of preservation in the case of ordinary verse, are for ballads the agents of destruction. The broadside press of three centuries ago, while it rescued here and there a genuine ballad, poured out a mass of vulgar imitations which not only displaced and destroyed the ballad of oral tradition, but brought contempt upon good and bad alike. Poetry of the people, to which our ballad belongs, is a thing of the past. Even rude and distant communities, like those of Afghanistan, cannot give us the primitive conditions. The communal ballad is rescued, when rescued at all, by the fragile chances of a written copy or of oral tradition; and we are obliged to study it under terms of artistic poetry,—that is, we are forced, to take through the eye and the

judgment what was meant for the ear and immediate sensation. Poetry for the people, however,—“popular poetry” in the modern phrase,—is a very different affair. Street songs, vulgar rhymes, or even improvisations of the concert-halls, tawdry and sentimental stuff—these things are sundered by the world's width from poetry of the people, from the folk in verse, whether it echo in a great epos which chants the clash of empires or linger in a ballad of the countryside sung under the village linden. For this ballad is a part of the poetry which comes from the people as a whole, from a homogeneous folk, large or small; while the song of street or concert-hall is deliberately composed for a class, a section, of the community. It would, therefore, be better to use some other term than “popular” when we wish to specify the ballad of tradition, and so avoid all taint of vulgarity and the trivial. Nor must we go to the other extreme. Those high-born people who figure in traditional ballads.—Childe Waters, Lady Maisry, and the rest,—do not require us to assume composition in aristocratic circles; for the lower classes of the people in ballad days had no separate literature, and a ballad of the folk belonged to the community as a whole. The same habit of thought, the same standard of action, ruled alike the noble and his meanest retainer. Oral transmission, the test of the ballad, is of course nowhere possible save in such an unlettered community. Since all critics are at one in regard to this homogeneous character of the folk with whom and out of whom these songs had their birth, one is justified in removing all doubt from the phrase by speaking, not of the popular ballad, but of the communal ballad—the ballad of a community.

With regard to the making of a ballad, one must repeat a caution hinted already, and made doubly important by a vicious tendency in the study of all phases of culture. It is a vital mistake to explain primitive conditions by exact analogy with conditions of modern savagery and barbarism. Certain conclusions, always guarded and cautious to a degree, may indeed be drawn; but it is folly to insist that what now goes on among shunted races, belated detachments in the great march of culture, must have gone on among the dominant and mounting peoples who had reached the same external conditions of life. The homogeneous and unlettered state of the ballad-makers is not to be put on a level with the ignorance of barbarism, nor explained by the analogy of songs among modern savage tribes. Fortunately we have better material. The making of a ballad by a community can be illustrated from a case recorded by Pastor Lyngbye in his invaluable account of life on the Faroe Islands a century ago. Not only had the islanders used from most ancient times their traditional and narrative songs as music for the dance, but they had also maintained the old fashion of making a ballad. In the winter, says Lyngbye, dancing is their chief amusement and is an affair of the entire community. At such a dance, one or more persons begin to sing; then all who are present join in the ballad, or at least in the refrain. As they dance, they show by their gestures and expression that they follow with eagerness the course of the story which they are singing. More than this, the ballad is often

BALLAD

a spontaneous product of the occasion. A fisherman who has had some recent mishap with his boat is pushed by stalwart comrades into the middle of the throng, while the dancers sing verses about him and his lack of skill—verses improvised on the spot and with a catching and clamorous refrain. If these verses win favor, says Lyngbye, they are repeated from year to year, with slight additions or corrections and become a permanent ballad. Bearing in mind the extraordinary readiness to improvise shown even in these days by peasants in every part of Europe, we thus gain some definite notion about the spontaneous and communal elements which went to the making of the best type of primitive verse; for these Faroe islanders were no savages, but simply a homogeneous and isolated folk which still held to the old ways of communal song.

Critics of the ballad, moreover, agree that it has little or no subjective traits—an easy inference from the conditions just described. There is no individuality lurking behind the words of the ballad, and, above all, no evidence of that individuality in the form of sentiment. Sentiment and individuality are the very essence of modern poetry and the direct result of individualism in verse. Given a poet, sentiment,—and it may be noble and precious enough,—is sure to follow. But the ballad, an epic in little, forces one's attention to the object, the scene, the story, and away from the maker.

"The king sits in Dumferling town,"

begins one of the noblest of all ballads; while one of the greatest of modern poems opens with something personal and pathetic, keynote to all that follows:

"My heart aches, and a drowsy numbness pains
My sense."

Even when a great poet essays the ballad, he either puts sentiment into it, or he keeps sentiment out of it by a *tour de force*. Admirable and noble as one must call the conclusion of an artistic ballad such as Tennyson's 'Revenge,' it is altogether different from the conclusion of such a communal ballad as 'Sir Patrick Spens.' That subtle quality of the ballad which lies in solution with the story, and which,—as in 'Child Maurice,' or 'Babylon,' or 'Edward,'—compels in us sensations akin to those called out by the sentiment of the poet, is a wholly impersonal if strangely effective quality, far removed from the corresponding elements of the poem of art. At first sight one might say that Browning's dramatic lyrics had this impersonal quality. But compare the close of 'Give a Rouse,' chorus and all, with the close of 'Child Maurice,' that swift and relentless stroke of pure tragedy which called out the enthusiasm of so great a critic as Gray.

The narrative of the communal ballad is full of leaps and omissions; the style is simple to a fault; the diction is spontaneous and free. Assonance frequently takes the place of rhyme, and a word often rhymes with itself. There is a lack of poetic adornment in the style quite as conspicuous as the lack of reflection and moralizing in the matter. Metaphor and simile are rare, and, when found, are for the most part standing phrases common to all the ballads; there is never poetry for poetry's sake. Iteration is the chief mark of ballad style; and

the favorite form of this effective figure is what one may call incremental repetition. The question is repeated with the answer; each increment in a series of related facts has a stanza for itself, identical, save for the new fact, with the other stanzas. 'Babylon' furnishes good instances of this progressive iteration. Moreover the ballad differs from earlier English epics in that it invariably has stanzas and rhyme; of the two forms of stanza, the two-line stanza with a refrain is probably older than the stanza with four or six lines.

This necessary quality of the stanza points to the origin of the ballad in song; but longer ballads, such as those that make up the 'Gest of Robin Hood,' an epic in little, were not sung as lyrics or to aid the dance, but were either chanted in a monotonous fashion or else recited outright. Chappell, in his admirable work on old English music ('Music of the Olden time,' ii. 790), names a third class of "characteristic airs of England"—the "historical and very long ballads, . . . invariably of simple construction, usually plaintive. . . . They were rarely if ever used for dancing." Most of the longer ballads, however, were doubtless given by one person in a sort of recitative; this is the case with modern ballads of Russia and Servia, where the bystanders now and then join in a chorus. Precisely in the same way ballads were divorced from the dance, originally their vital condition; but in the refrain, which is attached to so many ballads, one finds an element which has survived from those earliest days of communal song.

Of the oldest communal poetry no actual ballad has come down to us. Hints and even fragments, however, are pointed out in ancient records, mainly as the material of chronicle or legend. In the Bible (Num xxi. 17), where "Israel sang this song," we are not going too far when we regard the fragment as part of a communal ballad. "Spring up, O well: sing ye unto it: the princes digged the well, the nobles of the people digged it, by the direction of the lawgiver, with their staves." Deborah's song has something of the communal note; and when Miriam dances and sings with her maidens one is reminded of the many ballads made by dancing and singing bands of women in mediæval Europe—for instance, the song made in the 7th century to the honor of St. Faro, and "sung by the women as they danced and clapped their hands." The question of ancient Greek ballads, and their relation to the epic, is not to be discussed here; nor can we make more than an allusion to the theory of Niebuhr that the early part of Livy is founded on old Roman ballads. A popular discussion of this matter may be found in Macaulay's preface to his own 'Lays of Ancient Rome.' The ballads of modern Europe are a survival of older communal poetry, more or less influenced by artistic and individual conditions of authorship, but wholly impersonal, and with an appeal to our interest which seems to come from a throng and not from the solitary poet. Attention was early called to the ballads of Spain; printed at first as broadsides, they were gathered into a volume as early as 1550. On the other hand, ballads were neglected in France until very recent times; for specimens of the French ballad, and for an account of it, the reader should consult Prof. Crane's 'Chansons Populaires de

BALLADE — BALLANTINE

France' (N. Y. 1891). It is with ballads of the Germanic race, however, that we are now concerned. Denmark, Norway, Sweden, Iceland, the Faroe Islands, Scotland and England, the Netherlands and Germany—all these countries offer us admirable specimens of the ballad. Particularly, the great collections of Grundtvig ('Danmarks Gamle Folkeviser') for Denmark, and of Child ('The English and Scottish Popular Ballads') for our own tongue, show how common descent or borrowing connects the individual ballads of these groups. "Almost every Norwegian, Swedish, or Icelandic ballad," says Grundtvig, "is found in a Danish version of Scandinavian ballads; moreover a larger number can be found in English and Scottish versions than in German or Dutch versions." Again, we find certain national preferences in the character of the ballads which have come down to us. Scandinavia kept the old heroic lays (*kæmpeviser*); Germany wove them into her epic, as witness the Nibelungen Lay; but England and Scotland have none of them in any shape. So, too, the mythic ballad, scantily represented in English, and practically unknown in Germany, abounds in Scandinavian collections. The Faroe Islands and Norway, as Grundtvig tells us, show the best record for ballads preserved by oral tradition; while noble ladies of Denmark, three or four centuries ago, did high service to ballad literature by making collections in manuscript of the songs current then in the castle as in the cottage.

For England one is compelled to begin the list of known ballads with the 13th century. 'The Battle of Maldon,' composed in the last decade of the 10th century, though spirited enough and full of communal vigor, has no stanzaic structure, follows in metre and style the rules of the Old English epic, and is only a ballad by courtesy; about the ballads used a century or two later by historians of England we can do nothing but guess; and there is no firm ground under the critic's foot until he comes to the Robin Hood ballads, which Prof. Child assigns to the 13th century. 'The Battle of Otterburn' (1388) opens a series of ballads based on actual events and stretching into the 18th century. Barring the Robin Hood cycle,—an epic constructed from this attractive material lies before us in the famous 'Gest of Robin Hood,' printed as early as 1489,—the chief sources of the collector are the Percy Manuscript, "written just before 1650,—on which, not without omissions and additions, the bishop based his 'Reliques,' first published in 1765,—and the oral traditions of Scotland, which Prof. Child refers to 'the last 130 years.' Information about the individual ballads, their sources, history, literary connections, and above all, their varying texts, must be sought in the noble work of Prof. F. J. Child. For present purposes a word or two of general information must suffice. As to origins there is a wide range. The Church furnished its legend, as in 'St. Stephen'; romance contributed the story of 'Thomas Rymmer'; and the light, even cynical *fabliau* is responsible for 'The Boy and the Mantle.' Ballads which occur in many tongues may either have a common origin or owe their manifold versions, as in the case of popular tales, to a love of borrowing; and here, of course, we get the hint of wider issues. For the most part, however, a ballad tells some

moving story, preferably of fighting and of love. Tragedy is the dominant note; and English ballads of the best type deal with those elements of domestic disaster so familiar in the great dramas of literature, in the story of Orestes, or of Hamlet, or of the Cid. Such are 'Edward,' 'Lord Randal,' 'The Two Brothers,' 'The Two Sisters,' 'Child Maurice,' 'Bewick and Graham,' 'Clerk Colven,' 'Little Musgrave and Lady Barnard,' 'Glasgerion,' and many others. Another group of ballads, represented by the 'Baron of Brackley' and 'Captain Car,' give a faithful picture of the feuds and ceaseless warfare in Scotland and on the border. A few fine ballads,—'Sweet William's Ghost,' 'The Wife of Usher's Well,'—touch upon the supernatural. Of the romantic ballads, 'Childe Waters' shows us the higher, and 'Young Beichan' the lower, but still sound and communal type. Incipient dramatic tendencies mark 'Edward' and 'Lord Randal'; while, on the other hand, a lyric note almost carries 'Bonnie George Campbell' out of balladry. Finally it is to be noted that in 'The Nut-Brown Maid,' which many would unhesitatingly refer to this class of poetry, we have no ballad at all, but a dramatic lyric, probably written by a woman, and with a special plea in the background.

Bibliography.—Bonning, 'Servian Popular Poetry' (1827); Child, 'English and Scottish Popular Ballads' (1883-98); Gummere, 'Old English Ballads' (1894); Marin, 'Cantos Populares Españoles' (1882-3); Upland, 'Alte hoch-und niederdeutsche Volkslieder' (1892).

Ballade, ba-lad', the earlier and modern French spelling of "ballad," but now limited in its use to a distinct verse-form introduced into English literature of late years from the French and chiefly used by writers of *vers de société*. It consists of three stanzas of eight lines each, with an "envoy" or closing stanza of four lines. The rhymes, which are not more than three, follow each other in the stanzas, thus: a, b, a, b; b, c, b, c, and in the envoy, b, c, b, c; and the same line serves as a refrain to each of the stanzas and to the envoy. There are other varieties, but this may be regarded as the strictest, according to the precedent of Villon and Marot.

Ballanche, ba-lansh', **Pierre Simon**, French philosopher: b. Lyons, 4 Aug. 1776; d. 12 June 1847. His great work is the 'Palin-génésie Sociale' (1828), in which he seeks to illustrate the workings of God in history and sketch how human society may and will be reconstructed so as to attain its highest development. His works are a strange mixture of mysticism, socialism, and the philosophy of history. His 'Vision d'Hébal' (1832) is a prophetic forecast of the world's history, Hébal being a second-sighted chief of a Scottish clan.

Bal'lantine, James, Scottish artist and poet: b. Edinburgh, 11 June 1808; d. 18 Dec. 1877. He was brought up as a house-painter, but afterward learned drawing under Sir William Allen and was one of the first to revive the art of glass-painting. He was commissioned to execute the stained-glass windows for the House of Lords, and in 1845 published a treatise on glass-staining, which was translated into German. Two prose volumes, 'The Gaberlunzie's Wallet' (1843), and 'The Miller of Deanhaugh' (1845), contain some of his best-known songs and ballads. He was author of 'Poems'

BALLANTINE — BALLESTEROS

(1856 and 1865); 'One Hundred Songs with Music' (1865); 'Life of David Roberts, R. A.' (1866); and 'Lilias Lee' (1871).

Ballantine, William Gay, American educator: b. Washington, D. C., 7 Dec. 1848. He was graduated at Marietta College 1868, and at the Union Theological Seminary 1872; spent a year in study in Leipsic; was attached to the American Palestine Exploring Expedition of 1873; professor of chemistry and natural science in Ripon College 1874-6; professor of Greek and Hebrew in the University of Indiana 1878-81; professor of Old Testament language and literature at Oberlin Theological Seminary 1881-91; and president of Oberlin College 1891-6. Dr. Ballantine was one of the editors of the 'Bibliotheca Sacra' (1884-91).

Bal'lantyne, James, Scottish printer: b. Kelso, 1772; d. Edinburgh, 1833. Successively a solicitor and a printer in his native town, at the suggestion of Sir Walter Scott he removed to Edinburgh, where the high perfection to which he had brought the art of printing, and his connection with Scott, whose works he printed, secured him a large trade. The firm of James Bal'lantyne & Company included Scott, James Bal'lantyne, and his brother John (who died in 1821). For many years he conducted the *Edinburgh Weekly Journal*. His firm was involved in the bankruptcy of Constable & Company, by which Scott's fortunes were wrecked, but Bal'lantyne was continued by the creditors' trustee in the literary management of the printing-house. He survived Scott only about four months.

Ballantyne, James Robert, Scottish Orientalist: b. Kelso, Scotland, 1813; d. 1864. After receiving an education at Haileybury College he was sent to India, where he was placed in charge of the Sanskrit College at Benares. On his return to England he was made librarian of the East India office. Among his writings are 'The Practical Oriental Interpreter' (1843); 'Catechism of Sanskrit Grammar'; 'Synopsis of Science in Sanskrit and English, reconciled with the Truths to be found in the Nyaya Philosophy' (1856); 'Christianity Contrasted with Hindu Philosophy' (1859).

Ballantyne, Robert Michael, Scotch writer: b. Edinburgh, 1825; d. Rome, Italy, 8 Feb. 1894. He spent his youth in Canada in the service of the Hudson Bay Company, but in 1856 adopted literature as a profession. He became very popular in England as a writer of stories for boys. Among the best known are 'Deep Down,' 'The Coral Island,' 'The World of Ice,' 'Un-gava,' 'The Dog Crusoe,' and others.

Ballarat', or Ballaarat, an Australian town in the colony of Victoria, the chief centre of the gold-mining industry of the colony, and the place next in importance to Melbourne, from which it is distant west-northwest 74 miles by rail. It owes its present importance and prosperity to its being the centre of one of the richest gold-yielding districts of the world. It consists of two distinct municipalities, Ballarat West and Ballarat East, which are separated by Yarrowee Creek. The town is well lighted with gas, abundantly supplied with water, and contains many handsome public edifices, among which may be mentioned the city hall, council-chamber, two town halls, a spacious hospital, an orphan asylum, a benevolent asylum, a lying-

in hospital and refuge, public baths, a jail, mechanics' institute (with 22,500 volumes), a free library (with 15,000 volumes), a theatre, and several other places of amusement, post-office, extensive railway premises, forty churches, two cathedrals, the palaces of the Anglican and Roman Catholic bishops, two colleges, four grammar and various other schools, a school of mines, many banks, numerous fine hotels, etc. There are several iron-foundries, breweries and distilleries, flour-mills, woolen-mills, and other factories. Gold was first discovered at Ballarat in June 1851, and the extraordinary richness of the field soon attracted hosts of miners. When the surface diggings became exhausted it was discovered that richer deposits of the precious metal lay at greater depths, and now there are mines as deep as some coal-pits. They are worked by steam-pumping and other machinery, and give employment to over 6,000 men, about 1,000 of whom are Chinese. One of the largest nuggets ever found anywhere was discovered here, and was sold for \$52,000. The surrounding district is also eminently suitable for farming and sheep-breeding. In addition to the line to Melbourne, Ballarat has railway connection with Geelong, Ararat, Maryborough, Castlemaine, etc. Pop. (1897) 46,137.

Ballast. (1) Heavy matter, as stone, sand, iron, or water placed in the bottom of a ship or other vessel, to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aeronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the rails on a railway in order to make it firm and solid.

Bal'lentyne, or Bal'lenden, John, Scottish poet, and translator of Boece's 'Latin History,' and of the first five books of Livy into the vernacular language of his time: b. Lothian toward the close of the 15th century; said to have died at Rome, 1550. He was in the service of James V. from the king's earliest years, and at his request he translated Boece's 'History,' which had been published at Paris in 1526, the translation being printed in 1536. As a reward he was made archdeacon of Moray and a canon of Ross. He was a bitter opponent of the Reformation.

Balleny (bál'lā'ne) Islands, a group of five small volcanic islands, discovered in the Antarctic Ocean in 1839, nearly on the Antarctic Circle, and in lon. 164° E. One contains a very lofty mountain.

Ballerini, bál-lér-ē'nē. See CASUISTRY.

Ballesteros, bál-yēs-tā'rōs, Francisco, Spanish general: b. Saragossa, 1770; d. Paris, 22 June 1832. He first served in Catalonia against the French during the campaigns of 1792 and 1795, and was appointed to a captaincy. Discharged in 1804 on account of embezzlement, he was nevertheless entrusted by the all-powerful Godoy, "prince of the peace," with one of the most productive offices in the custom-house, the direction of the *resguardo* at Oviedo. When the French army invaded Spain in 1808, Ballesteros was promoted to a colonelcy by the provincial junta of Asturia, and joined the Castilian army under Castaños and Black. The regency of Cadiz promoted him to the rank of lieutenant-general and put him in command of the army of

BALLESTREM — BALLISTIC GALVANOMETER

Andalusia. He had then to fight against some of the most skilful chiefs of the French army, and succeeded in avoiding their pursuit by peculiar tactics. When Wellington was entrusted in 1812 with the general command of all the armies in the Peninsula, Ballesteros showed such violent opposition that he was arrested as guilty of treason and sent as a prisoner to Ceuta. A few months later he was restored to liberty, but was not allowed to re-enter the military service. On the return of Ferdinand VII to Spain Ballesteros made such a show of devotion to monarchical principles that he was appointed secretary of war, but was soon dismissed and sent to Valladolid, where he was placed under the strictest surveillance. When the struggle between the royalists and the constitutionalists commenced, he managed so artfully that each party thought Ballesteros was acting in concert with them. Commissioned by the chiefs of the latter to obtain the assent of the king to the constitution, he succeeded beyond their anticipations and became a member of the council of state, while he was at the same time admitted in the *comuneros* association. This double-dealing seemed to be perfectly successful, for in 1823, on the entry of the French into Spain he was appointed to the command of the army; but instead of showing fight he concluded a capitulation with the Duke of Angoulême, which became the occasion of accusations of such a character that Ballesteros thought it imprudent to stay any longer in his own country, and took refuge in France, where he died a forgotten exile.

Ballestrem, bal'lês-strâm, **Franz Xaver, Count von**, German statesman: b. Plawno-witz, in Upper Silesia, 1834. Entering the Prussian army he served during the Austro-Prussian campaign of 1866 and the Franco-Prussian war of 1870-1. At the close of the latter he was elected to the Reichstag, where he soon became prominent in the Centre party. Pius IX appointed him a papal chamberlain for his activity in the Culturkampf, and he was first vice-president of the lower House, 1890-3.

Ballet, bāl'lā, or bāl'lēt, (from *bal*; from the French *baller*, and the Italian *ballare*, to dance), a kind of dance now usually constituting an interlude in a theatrical performance. In its widest sense a ballet is the representation of a series of passionate actions and feelings by means of gestures and dancing. In a more confined sense we call ballets musical pieces, the object of which is to represent by mimic movements and dances, actions, characters, sentiments, passions, and feelings, in which several dancers perform together. According to the analogy of lyrical poetry those which rather represent feelings may be called lyrical ballets; those which imitate actions, dramatic ballets. The lyrical and dramatic ballets, together, constitute the higher art of dancing, in opposition to the lower, the aim of which is only social pleasure. Dramatic ballets are classed as historical, the subject of which is a real event; mythological, in which the subject is some fabulous action; and poetical, founded on poetical fiction, to which belong also the allegorical, necessarily the most imperfect. A ballet is usually divided into several acts, each of which has several *entrées*. An *entrée*, in a ballet, consists of one or several quadrilles of dancers,

who, by their steps, gestures, and attitudes, represent a certain part of the action. In criticising a ballet we must consider, first, the choice of the subject, which must have unity of action or of passion, and be capable of being represented in an intelligible manner by means of mimic movements and dancing; secondly, the plan and execution of the single parts, which must have due proportion to each other; and, finally, the music and decorations, which must supply whatever dancing cannot bring before the eye. The ballet is an invention of modern times. Baltazarini, director of music to Catherine de' Medici, probably gave its form to the regular ballet, though pantomimic dances were not unknown to the ancients. The ballet owes much to the French, and particularly to Noverre.

Balliet, Thomas M., American educator: b. 1 March 1852. He was educated at Franklin and Marshal College (Lancaster, Pa.) and at Yale, was appointed superintendent of public schools in Springfield, Mass., and also became associate editor of the 'Pedagogical Seminary'. His writings include 'Some New Phases of Educational Thought'.

Balliol (bāl'yol) **College**, Oxford, an important college founded between 1263 and 1268 by John Balliol (q.v.). The original foundation consisted of 16 poor scholars, and the revenue for their maintenance amounted for many years to only 8d. per week for each. From 1340 to 1830 the college was greatly enriched by various benefactions. The society consists of a master, 13 fellows, and 24 scholars. The number of members on the books is about 600. The master and fellows enjoy the privilege of electing their own visitor. John Wyclif was master of this college in 1361; among its scholars have been John Evelyn, Bradley the astronomer, Mathew Arnold Swinburne, and the late Archbishop Temple. The Snell exhibitions for students of Glasgow University attract annually to this college a few distinguished Scottish students.

Ballis'tic Galvano'meter, a galvanometer (q.v.) designed or used for the measurement of electric currents of very short duration. It does not necessarily differ in any essential particular from other galvanometers, except that the natural period of oscillation of its needle must be long in comparison with the duration of the transient currents that are to be measured. If C is the intensity of the current that is to be measured, and t is the time during which it passes, the general theory of the instrument is as follows: The magnetic moment tending to deflect the needle is proportional to C , and the angular velocity that such a magnetic moment can produce when acting upon a freely suspended body like the needle is proportional to t . Hence the angular velocity actually communicated to the needle is proportional both to C and to t ; or, in other words, it is proportional to the product Ct . But an electric "current" (such as is here denoted by C) is defined as the quantity of electricity passing per second; and hence Ct is the quantity of electricity passing in the time t . The angular velocity actually communicated to the needle (which is inferred by observing the extent of the swing) is therefore proportional to the total quantity of electricity passed through the galvanometer during the short time t , and not to

BALLISTICS — BALLOON

the intensity of the current. This constitutes the chief peculiarity of the instrument. The ballistic galvanometer measures the total quantity of electricity passed through the instrument, and its readings are in coulombs; while other galvanometers measure the intensity of the current passing, and their readings are in amperes. If the needle of the instrument moves sensibly during the passage of the current, the magnetic movement exerted upon the needle will also vary, even though the current itself remains constant. It is for this reason that the period of free swing of the needle must be long if the instrument is to be used ballistically.

Ballis'tics. See ORDNANCE.

Bal'listite. See EXPLOSIVES.

Balloon', a bag-like receptacle filled with hydrogen, coal-gas, or other light gaseous matter, and designed to rise in the air. The first balloon was constructed by Stephen and Joseph Montgolfier, sons of Peter Montgolfier, a well-known paper-maker of Annonay, France. Observing the suspension of clouds in the air, they conceived the idea of filling a light bag with some substance of a cloud-like nature, and trying it to see if it would not ascend. After experimenting on a small scale with paper bags filled with smoke, they constructed a linen bag about 30 feet in diameter and inflated it with hot air from a fire fed with chopped straw. The attempt was entirely successful, and on 5 June 1783, the balloon rose to a height of about a mile and a half in the presence of a considerable number of amazed spectators.

As might be expected, an experiment of so novel a nature attracted a great deal of attention, and only two months later a balloon was constructed on more scientific principles by M. Charles, of Paris. The bag used by M. Charles was made of thin varnished silk, and inflated with hydrogen gas generated by the action of sulphuric acid upon iron filings. Some difficulty was found in filling the bag satisfactorily, but the task was completed at the end of four days, and on 27 Aug. 1783, the balloon rose from the Champ de Mars to a height of 3,000 feet, remaining in the air for about three quarters of an hour and eventually falling in a field about 15 miles away, where it was torn to shreds by terrified peasants. The excitement in Paris was very great, and plans were laid to build balloons large enough to sustain human beings. After several trials with a captive balloon of the hot-air or Montgolfier type, M. François Pilâtre de Rozier, satisfied that there would be no difficulty in maintaining a fire under the balloon while in the air, made an ascension from the Bois de Boulogne on 21 Nov. 1783, accompanied by the Marquis d'Arlandes. They remained in the air about 25 minutes, during which time they rose to a height of 500 feet and traversed a horizontal distance of over five miles. Ten days later, on 1 Dec. 1783, MM. Charles and Robert made a similar ascension in a balloon filled with hydrogen. They rose to a height of 2,000 feet, and returned to the earth, after about two hours, at Nesle, about 27 miles from their starting-point at Paris. M. Robert then left the car, and M. Charles made a second ascent alone. Owing to an error in the amount of ballast taken in to compensate for the weight of M. Robert, the balloon, when freed, rose rapidly to a height of

about two miles, but no accident resulted, and M. Charles returned to the earth safely.

One of the most famous balloon ascents was that made by Glaisher and Coxwell on 5 Sept. 1862, its avowed object being to ascend to as great a height as possible. The balloon left the ground at 1.03 P.M. and at 1.49 it had attained an altitude of no less than five miles. The temperature then observed was 2° F., the temperature at the earth's surface being 59° F. Mr. Glaisher's own account is as follows:

Up to this time I had taken observations with comfort. I had experienced no difficulty in breathing, while Mr. Coxwell, in consequence of the necessary exertions he had to make, had breathed with difficulty for some time. At 1.51 the barometer reading was 10.80 inches. . . . I could not see the column of mercury in the wet-bulb thermometer; nor afterward the hands of the watch, nor the fine divisions on any instrument. I asked Mr. Coxwell to help me read the instruments, as I experienced a difficulty in seeing. In consequence, however, of the rotatory motion of the balloon, which had continued without ceasing since the earth had been left, the valve-line had become twisted, and he had to leave the car and mount into the ring above to adjust it. At this time I looked at the barometer and found it to read 9.94 inches, implying a height of 29,000 feet, and it was still falling fast. Shortly afterward I laid my arm upon the table, possessed of its full vigor, and on being desirous of using it I found it powerless. I tried to move the other arm and found it powerless also. I then tried to shake myself and succeeded in shaking my body. I seemd to have no limbs. I then looked at the barometer, and while doing so my head fell on my left shoulder. I struggled and shook my body again, but could not move my arms. I got my head upright, but for an instant only, when it fell on my right shoulder, and then I fell backward, my back resting against the back of the car, and my head on its edge; in this position my eyes were directed toward Mr. Coxwell in the ring. When I shook my body I seemed to have full power over the muscles of the back, and considerable power over those of the neck, but none over either my arms or my legs, in fact, I seemed to have no arms or legs. As in the case of the arms, all muscular power was lost in an instant from my back and neck. I dimly saw Mr. Coxwell in the ring, and endeavored to speak, but could not; and in another instant intense black darkness came; the optic nerve finally lost power suddenly. I was still conscious, with as active a brain as at the present moment while writing this. I thought I had been seized with asphyxia, and that I should experience no more, as death would come unless we speedily descended; other thoughts were actively entering my mind when I suddenly became unconscious as on going to sleep. I cannot tell anything of the sense of hearing; the perfect stillness and silence of the regions six miles from the earth (and at this time we were between six and seven miles high) is such that no sound reaches the ear. My last observations were made at 1.54, at 29,000 feet. I suppose two or three minutes, fully, were occupied between my eyes becoming insensible to seeing fine divisions and 1.54, and then that two or three minutes more passed till I was insensible; therefore I think this took place at about 1.56 or 1.57. While powerless, I heard the words "temperature" and "observation," and I knew Mr. Coxwell was in the car speaking to me and endeavoring to arouse me, therefore consciousness and hearing had returned. I then heard him speak more emphatically, but I could not see, speak, or move. I heard him again say, "Do try—now do." Then I saw the instruments dimly, then Mr. Coxwell; and very shortly I saw clearly. I rose in my seat and looked around, as though waking from sleep but not refreshed by sleep, and said to Mr. Coxwell, "I have been insensible." He said, "You have; and I too, very nearly." I then drew up my legs, which had been extended before me, and took a pencil in my hands to begin observations. Mr. Coxwell told me that he had lost the use of his hands, which were black, and I poured brandy over them. I resumed my observations at 2.07, recording the barometer reading at 11.28 inches and temperature—2° F. I supposed that three or four minutes were occupied from the time of my hearing the words "temperature" and "observation" till I began to observe. If so, then returning consciousness came at 2.04, and this gives seven minutes for total insensibility. Mr. Coxwell told me that while in the ring he felt it piercingly cold; that hoar frost was all around the neck of the balloon; that on attempting to leave the ring he found his hands frozen, so that he had to place his arms on the ring

BALLOON

and drop down; that he thought for a moment I had lain back to rest myself; that he spoke to me without eliciting a reply; that he then noticed my legs projected and my arms hung down by my side; that my countenance was serene and placid, without the earnestness and anxiety he had noticed before going into the ring, and then it struck him I was insensible. He wished to approach me, but could not, and he felt insensibility coming over himself; that he became anxious to open the valve, but in consequence of his having lost the use of his hands he could not, and ultimately did so by seizing the cord with his teeth and dipping his head two or three times until the balloon took a decided turn downward. No inconvenience followed this insensibility, and when we dropped it was in a country where no conveyance of any kind could be obtained, so that I had to walk between seven and eight miles. The descent was at first very rapid; we passed downward three miles in nine minutes; the balloon's career was then checked, and it finally descended in the centre of a large grass field at Cold Weston.

Another extremely high ascension was made on 4 Dec. 1894, by Prof. Berson, from Berlin, Germany. His last reading showed a barometric height of 912 inches, and a temperature of -54° F. The temperature at the surface of the earth was 37° F., and the barometric height 30.02 inches. The calculated height attained was 28,750 feet.

The balloon, strictly speaking, is not a flying-machine, nor is it ordinarily under control, so far as its horizontal direction is concerned. It moves with the wind, and (to the aeronaut) is in a calm at all times. The first step in advance of the drifting balloon is to be found in one fitted with some form of propelling machinery, by which the movement is controlled and the balloon navigated and made to move to a certain extent independently of the direction and velocity of the wind. The difficulties lying in the way of a satisfactory solution of the problem of controlling the motion of a balloon are very great. The bulk of the balloon is necessarily vast, and a correspondingly large area is exposed to the action of the wind. Also, the motor that is used must combine great power with extreme lightness.

In working this problem out, France has maintained the lead that her early experiments gave her. A regular balloon corps is attached to the army, both in France and in Germany; and for many years special attention has been directed to the design and construction of dirigible balloons. The details of the mechanisms employed, as well as of the exact contour of the gas envelope, are guarded as military secrets, but enough is known about them to give a general idea of what has been done. Attention was first publicly directed to the success attained with the dirigible balloons of the French army in 1893, by an article in the *Mémoires de la Société des Ingénieurs Civils*. The true progenitor of the dirigible balloon was Gen. Meusnier, who, in a series of papers published in 1783, set forth a scheme for a balloon of this sort. It was not until 1852, however, that Henri Giffard made a rational attempt to construct one. His balloon was spindle-shaped and measured about 144 feet from point to point. His motor was, however, too weak to permit of making any headway against even a moderate breeze, though the balloon could be steered and made to describe circles while drifting. His general form of envelope-construction has been followed by all experimenters since that time.

In 1870 M. Dupuy de Lôme undertook the task of constructing a dirigible balloon. The propeller used was two-armed, 19 feet 8 inches

in diameter and was turned by eight men. The spindle shape was used for the envelope. A trial was made at Vincennes in 1872, where in a breeze of 39 feet per second a deviation of 12° was obtained. The stability was perfect despite the exertions of the eight men at the crab; still the balloon was a drifting one, and was dirigible only in the sense that it could be made to deviate to a slight extent from the true course of the wind. To an outside observer the problem seemed as far from solution as ever; but when taking into consideration the insufficiency of the motor, the committee appointed to be present at the trial said: "It serves as a starting-point for all who wish to continue in this direction."

Others have endeavored to continue the improvement, and the first to achieve results that even approached success was M. Gaston Tissandier, who, with his brother Albert, in 1884, constructed a balloon that was fitted with a Siemens motor driven by a bichromate of soda battery, very ingeniously arranged so as to minimize the weight and at the same time produce the greatest possible effect. The motor weighed 121 pounds and the cells weighed 496 pounds, and contained liquid enough to work for $2\frac{1}{2}$ hours, generating during that interval $1\frac{1}{2}$ horse-power. The screw had two arms and was a little over nine feet in diameter. Several ascensions were made with this balloon. In one, undertaken in 1884, the motor developed $1\frac{1}{2}$ horse-power and was sufficient to propel the structure through the air at a rate of 13 feet per second. After having practically followed the direction of the wind, which had a velocity of about 10 feet per second, during which the rudder turned it aside a little, the balloon was made to describe a semi-circle, and brought up with its head into the wind, where it was navigated for about 10 minutes directly above Grenelle, and the same evolution was repeated above the observatory. Through the exhaustion of the battery it became impossible to return to Paris. These experiments were quickly followed by the work of Commandant Renard of the French balloon corps. With a spindle-shaped balloon, but with a more powerful motor, and the screw placed at the front instead of at the rear, he succeeded in making several ascents and returning to the point of departure. The motor developed 8.5 horse-power, with a weight of 220.5 pounds. In an ascension made on 23 Sept. 1885, the balloon started from Chalais-Meudon against the wind, and went to Paris, where it was easily handled, afterward returning to Chalais.

This work has been continued by the French balloon corps until now the army is possessed of a dirigible balloon that may be considered controllable in light airs. The problem has not been left solely to the military departments of the several nations of the earth for solution, however, for private investigators have been constantly at work upon it. In 1901 a young Brazilian named Santos Dumont made a series of brilliant experiments in France, constructing several balloons, one after another, each being an improvement on its predecessor. In striving for a prize of \$20,000 offered by M. Deutsch for the first dirigible balloon that should start from the Parc d'Aérostation at St. Cloud and be sailed around the Eiffel Tower in Paris and brought back to

BALLOON VINE; BALLOT

the starting-point in thirty minutes, Santos Dumont succeeded in covering the ground in but 40 seconds above the stipulated time. The total distance is a little less than nine miles. This balloon (his sixth) had a length of 108 feet and a diameter of 19 feet 6 inches, and was driven by a 4-cylinder petroleum motor weighing 216 pounds and developing 20 horse-power. The screw was a little more than 13 feet in diameter, and was turned at a speed of 300 revolutions per minute. Instead of the old-fashioned network, the basket and machinery were suspended directly from the envelope by strong piano wire. Japanese silk was used for the envelope itself, and was made impervious to the gas by four coats of linseed oil. See also AERIAL LOCOMOTION; FLYING-MACHINE.

Balloon Vine (*Cardiospermum Helicacabum*), a tropical American and East Indian climbing annual herb of the natural order *Sapindaceæ*, with racemes of small white flowers followed by bladder-like seed-vessels from which the plant is named. It is a general favorite of easy garden culture.

Ballot ("little ball"): essentially, a secret as distinguished from an open vote, to secure the voter from previous intimidation or subsequent revenge. Recent methods of ballot-reform, therefore, are only devices to obtain the result inherent in its very nature, a non-secret ballot being a contradiction in terms and the same as *viva voce* voting. The various forms of ballot reduce to two in essence: ballots themselves indicating choice,—as colored balls, printed tickets, or mechanical devices showing names,—and depositories indicating the choice. The former is universal in modern times and most general in ancient.

The ballot must be nearly as old as the practice of voting by unprotected bodies of citizens; but our first knowledge of it is in classic Greece, where the *dikasts* (popular courts and juries) voted "yes" or "no" by balls of stone or metal (white or unpierced meaning acquittal, black or pierced indicating condemnation), by marked shells (*ostrakoi*, whence "ostracism" or banishment of an unpopular leader), or by olive leaves ("petalism"). In the assemblies the common voting was by show of hands, to secure public responsibility; in cases of privilege or ostracism it was by ballot. In Rome the first ballot law (though far from the first balloting) was the Gabinian, 139 B.C., and the machinery is very modern: *tabellæ*, or tickets, with candidates' names, or "yes" and "no" ballots for changes in the laws; boxes, inspectors, and check-lists; but in case of a tie the candidates drew lots. In the mediæval republics the ballot was a regular machinery; but it has been bitterly fought and slow of introduction in all non-republican countries, the governments and the privileged classes being loth to weaken their power of dragging their officials or the lower classes into obedience. In Scotland it was used in 1662 under the name of "billeting" to banish political opponents (ostracism); but the English government disallowed the act. In England it was first put forward to protect members of parliament against government revenge for voting against its bills, not the electors against the classes which furnished the members of parliament; in 1710 the House of Commons passed a ballot law, but the Lords threw it out.

In the modern world the American colonies of England were by far the first to make the ballot (voting "by papers") the foundation of the governmental system: they used it from the first, and it was made obligatory in several of the State constitutions adopted in 1776. New York, with its great landed aristocracy, was slower, using it only for the governor and lieutenant-governor in 1778, and not extending it to the legislature till 1787. The southern States held to the *viva voce* system for many years after, and Kentucky till 1891, its constitution providing for it, though the United States statutes compelled it to use written or printed ballots for Congressional elections. All the State constitutions now provide for elections by ballot.

In Great Britain it was not only fought by the privileged classes as overthrowing their leadership of the tenants and artisans, but by a large part even of the Liberals as undermining the manliness of the English character. The vanguard of the movement were the Benthamites, and it stood foremost in the programme of reform put forward by the more radical Whigs early in the 19th century. It was in the first draft of the Reform Bill of 1832; in 1833 Grote the historian introduced it, and repeated the attempt every year till 1839 with a fresh speech of immense force and learning. It was supported by Macaulay with his usual effectiveness, but was sneered at by so good a Liberal as Sydney Smith, and heartily supported by none but the Chartists, whose support alone would have killed it. They made it one of the "six points" of their "People's Charter." In 1851 it was carried in the Commons by 51 majority against Lord John Russell and his Liberal government, but went no further. In 1869 it was tried at Manchester as a test, and worked well; was adopted at school-board elections in 1870; and the same year a select committee of the House, headed by Lord Hartington, reported in its favor as a means of lessening corruption, "treating," and intimidation. In 1872 Mr. W. E. Forster's ballot act made printed ballots compulsory at all national and municipal elections except those of university candidates for parliament. This put an end to the drunken riots attending the previous public nominations at the hustings, so keenly satirized by Dickens and others.

In France, Spain, Belgium, Switzerland, and Cisleithan Austria the ballot is now used; in Hungary it was formerly employed in all elections, but in 1874 was restricted to municipal councils.

The interest of governments and privileged classes in aristocratic countries to defeat the secrecy of the ballot is replaced in democratic ones, of which the United States is chief, by the interest of party managers, who wish either to prevent independent voting through fear of loss of employment or favor, or to make sure of purchased votes being given as promised; they have therefore devised various methods of evading the nominal secrecy of the vote, such as ordering the voter to write his name or some understood sign on the ballot before depositing it, holding it in sight of the party watcher while casting it, having a "friend" accompany him to the polls on pretense of his illiteracy and inability to go through the legal forms without help, etc. These enforce as constant a struggle from

BALLOU

the guardians of political honesty to circumvent them: the first has been stopped by throwing out as illegal all ballots with distinguishing marks on them; the second by compelling them to be cast in sealed official envelopes, and by forbidding any but the official registrars to come within a certain distance of the polls for any purpose but to vote, and later by providing booths in which each voter prepares his ballot in privacy; the third is practically confined to certain States and cities with a large percentage of real illiteracy under which the feigned article can cover itself and cannot well be directly reached by law, but only by the vigilance of each party in exposing the fraudulent practices of the other. The ballot itself also has brought in many frauds for which the *viva voce* system gave no opportunity, which are reducible to three kinds: (1) counterfeiting, either by printing the name of one party over the candidates of another, or by substituting one or more names on the opposite party's ticket; (2) "stuffing" the ballot-box by folding two or more ballots, all but one being sometimes of tissue paper, to look like one; (3) "repeating," one man voting at different polling-places more than once or at the same one under different names. The first must be defeated by party vigilance; the second is used only where one party has the control of ballot inspection, though the law usually provides that both the chief parties shall have a share in this; the third and second are punishable by law.

Another evil, as diminishing individual responsibility for votes and building up unprincipled and corrupt party dominance, though not direct fraud like the others, is the "party ballot." This is due to the great multiplication of candidates to be voted for at one time, and the consequent cost of printing and distributing the ballots to voters, which has led to the abandonment of the candidates themselves doing this work, and the forming of party organizations for it, which, in return for their efforts insist on subservience and are apt to have slight scruples about gaining their ends. All these evils together—the misuse of ballot methods to pervert their intent, the only partial secrecy, and the supremacy of party in the voting—have latterly built up a great body of opinion that some better methods should be devised, the general movement being known as "ballot reform."

The party ballot has in many States been set aside by some form of the so-called "Australian ballot" (from its first use in South Australia), or official ballot, furnished by the State. The essential feature of the plan is that all candidates in the field for any office shall be placed on one ballot, and the voter compelled to indicate his preference by a mark against one; thus forcing him to think personally concerning each one, inviting to independence of judgment, breaking down the tyranny of the party vote, and putting some intelligence into the "brute vote" even though the name of the party of each candidate is added. The first States to adopt the system were Massachusetts for the whole State, and Kentucky for Louisville, in 1888; and in 1895 every State in the Union except Georgia, Louisiana, and North and South Carolina had adopted some modification of the system. But the modifications were important; they were due to struggles of the local party organizations for one of two objects, or both,—to defeat the secrecy of the new régime and keep

track of the purchased votes, or to prevent "scratching" and ensure that their voters should cast "straight tickets"; in other words, to emasculate the system of its vital principle. The ideal and typical form is the "blanket ballot," wherein all candidates are given in the alphabetical order of the offices without regard to party; but this is strongly opposed on the nominal ground that the illiterate voters, and a large part of those not technically such, do not wish to vote anything but the straight party ticket, and should not be hindered in their choice, much less deprived of it. In concession to this useful element of citizenship, most of the States group the names and offices by parties. In general there is a blanket ballot with all parties on it, but each party given a column by itself, with some conspicuous device, like an eagle or a star, at its head, which the illiterate can be taught to recognize, the voter, in order to vote the straight ticket, making a cross in the circle under the emblem, while for a scattered or split vote he makes the cross in the space before the desired name. In New York and New Jersey this is carried further still, each party having a separate ticket and pasters being allowed; which is in fact the old-fashioned sort, the modifications having taken all the distinctive features out of the system, except the State supply.

A newer feature of ballot reform is the substitution for the ballot paper, which is folded and deposited by hand, of voting-machines, which are contrivances that both record the votes and count them, enabling the inspectors to see at any moment how many votes have been cast, and for whom. Several States have authorized the use of machines, and others are considering the matter. Three varieties of the voting-machine have been legally sanctioned: (1) The Myers, in which the single ballot is placed in a frame having a push-knob for each candidate, the voter indicating his choice by pushing the knob opposite his candidate's name, when the machine indicates the vote on a dial at the back of the frame, and locks the knobs of all other candidates for the same office (before a second voter is ready, all knobs are unlocked); (2) the McTammany, which contains on its face a slot for each office, beneath which is a card bearing the names of the candidates for the office seen through the slot, the voter's choice being indicated by turning a wheel till the name of his candidate appears, when he pushes a knob which punctures the tally-sheet; and (3) the Rhines, in which the names are arranged as in the Myers, by parties and offices. Slip names are inserted in the push buttons; and separate tally-sheets for each candidate, with vertical serial numbers, are placed beneath the face, the voter pushing a button which places a punch in such a position for each name that when the lid of the machine is closed the next number on each tally-sheet is punctured. See UNITED STATES, BEGINNINGS OF PARTY ORGANIZATION IN THE.

Ballou', Hosea, American clergyman and author: b. Richmond, N. H., 30 April 1771; d. Boston, Mass., 7 June 1852. His boyhood was spent in the greatest poverty, but at 21 he began to preach, having adopted the Universalist doctrines. He was successively pastor of congregations in Dana, Mass.; Barnard, Vt.; Ports-

BALLOU — BALMEZ

mouth, N. H., and Boston, Mass., in which latter place he held his pastorate for more than 35 years. He founded the 'Universalist Magazine,' subsequently called 'The Universalist Expositor,' and again the 'Universalist Quarterly Review.' A voluminous writer, his chief works are: 'Notes on the Parables' (1804); 'Lecture Sermons' (1831); 'Examination of the Doctrine of Future Retribution' (1834), his most important contribution to theological literature. His published works would make more than a hundred 12mo volumes.

Ballou', Maturin Murray, American journalist, son of Hosea Ballou: b. Boston, 14 April 1820; d. 27 March 1895. Besides editing 'Ballou's Pictorial,' 'The Flag of Our Union,' 'Ballou's Monthly,' etc., and making a valuable compilation of quotations, he wrote 'History of Cuba' (1854); 'Biography of Hosea Ballou,' 'Life Work of Hosea Ballou.' Becoming in later life an extensive traveler, he wrote a number of books of travel, including 'Due West,' 'Due South' (1885); 'Due North,' 'Under the Southern Cross,' 'Footprints of Travel,' etc. In 1872 he became one of the founders and the editor-in-chief of the Boston *Globe*.

Ball's Bluff, Va., a point on the Potomac River, about 33 miles above Washington, where the bank rises about 150 feet above the level of the river. It is noted as the scene of a battle between a Union force under Col Edward D. Baker, and a Confederate force under the command of Gen Evans, 21 Oct 1861. The battle resulted in the serious defeat of the Union force and the instantaneous death of Col. Baker.

Ballston Spa, N. Y., county-seat of Saratoga County, on the Delaware & Hudson R.R., seven miles south of Saratoga Springs. It is noted for its mineral springs, which rank among the best acidulous chalybeate springs in the country, and was formerly a popular summer resort, but is now most important for its manufactories, which include one of the largest tanneries in the world; extensive pulp and paper mills, and agricultural implement factories. It has two national banks, several churches, public high school, and daily and weekly newspapers. Pop. (1900) 3,923.

Ballyme'na, a market town in County Antrim, Ireland, on the River Braid, 25 miles northwest of Carrickfergus. It has a cotton-spinning mill, a distillery, numerous bleaching-grounds, a church, chapels, large public schools, several branch banks, and a United States consular agency. Pop. (1900) 9,000.

Balm (*Melissa officinalis*), a perennial herb of the natural order *Labiata*, native of southern Europe, cultivated for culinary use and found wild as an escape in many countries. It attains a height of about 18 inches, is much branched, has ovate leaves and whorls of white or yellowish axillary flowers rich in nectar, for which the plant is sometimes cultivated as bee-forage. Its foliage, which has a lemon-like odor and slightly aromatic taste, is used to flavor wine and to a small extent in domestic medicine. Some other members of the *Labiata* are called balm—for instance: Bastard balm (*Melittis melissophyllum*), a handsome member of the same family, often dried for its long-enduring fragrance. Moldavian balm (*Dracocephalum moldavica*), a Siberian annual of less pleas-

ant qualities than true balm, largely used in Germany for flavoring. Horse balm (*Collinsomia canadensis*) and tea balm (*Monarda didyma*) are American species of little importance. A variety of catnip (*Nepeta cataria*) so closely resembles true balm as often to be mistaken for it. For cultivation see HERBS (*Culinary*).

Balm of Gilead, a liquid resinous balsam highly reputed in the East since Bible times for its fragrance and supposed medicinal properties, believed to be derived from *Commiphora opobalsamum*, a small Abyssinian and Arabian tree. Balm of Mecca, or opobalsam, is a specially high grade of balm of Gilead obtained from incisions in the bark. The wood and fruit are boiled to obtain the inferior grades. The balm of Gilead of the United States is a variety of poplar (*Populus balsamifera*, var. *candicans*). See POPLAR.

Balmaceda, bál-ma-sá'da, **José Manuel**, Chilean statesman: b. Santiago, 1840; d. 18 Sept. 1891. He was educated at the Seminario Conciliar in Santiago; early became noted as an orator, urging radical reforms in the Constitution of 1833; and was a founder of the Reform Club in 1868. As deputy for five terms, 1870-85, he urged the separation of Church and State and became the leader of the Progressives. He was Chilean minister at Buenos Ayres in the early part of the Chile-Peru war, 1879-83, and secured the neutrality of Argentina. In 1882 he was made minister of the interior, and introduced liberalizing bills, as for civil marriage, etc. In 1885 he was elected senator and appointed minister of foreign affairs. Elected president in 1886, he carried out large schemes of reform and democratization; popular education was extended, civil marriage carried in 1888, railroads and other internal improvements forwarded. But both his measures and men involved war against the clerico-oligarchy which not only ruled the state but monopolized the offices, and comprised the bulk of the property and influence; and when he tried to prevent the ruin of his work by "influencing" the election of a like successor, his opponents blocked the administration. He appointed a ministry of his own stripe and dissolved Congress, virtually making himself dictator; but the Congressionalists, having the naval officers on their side, began war 7 Jan. 1891, secured the nitrate provinces, and, using their revenues to buy the best arms and munitions, utterly routed Balmaceda's forces in a decisive battle near Valparaíso, 7 August. He took refuge in the Argentine legation at Santiago, and committed suicide there a few weeks later.

Balme, bām, **Col de**, an Alpine pass, forming the boundary between Savoy and the Valais, 7,218 feet above sea-level. It is much visited, and has a travelers' refuge.

Balmerino, bāl-mer-ē'nō, **Arthur Elphinstone, Lord**, Scottish Jacobite: b. 1688; d. 1746. He took part in the rebellion of 1715, and fought at Sheriffmuir. Having joined the Young Pretender in 1745, he was taken prisoner at Culloden, tried at Westminster, found guilty and beheaded. His title was from Balmerino, in Fife.

Balmez, bāl'méth, or **Balmes**, bāl'mes, **Jaime Luciano**, Spanish priest and author: b. Catalonia, 28 Aug. 1810; d. 9 July 1848. His works include 'Protestantism Compared with

Catholicism in Its Relation to European Civilization' (3 vols. 1848); 'Filosofia Fundamental,' etc.

Balmoral (bál-mór'al) **Castle**, the favorite Highland residence of the late Queen Victoria, beautifully situated on the south bank of the Dee, 48 miles west of Aberdeen, and in the county of the same name. The site on which it stands is almost completely hemmed in by majestic mountains, and the views from the castle are magnificent. Balmoral was originally a shooting-lodge of the Earl of Fife, but was leased to, and greatly enlarged by, a brother of the Earl of Aberdeen, and in 1848 the reversion of the lease was purchased by Prince Albert. The accommodation furnished by the old building was very inadequate, and accordingly, the property having been purchased in 1852, the present mansion was erected shortly afterward. It underwent some enlargement in 1888. It is built of gray granite, in the Scottish baronial style, and has a massive and imposing appearance in the distance. It consists of two blocks connected by wings, and has a massive tower 80 feet high, with a turret of 20 feet high. The estate, which was the queen's private property, comprises some 40,000 acres, three fourths being deer-forest.

Balnaves, bál-náv'ës, **Henry**, Scottish reformer: b. Kirkcaldy, 1520; d. 1579. He was educated at St. Andrews, and though at first a Roman Catholic he became a Protestant and made open profession of his faith in 1542, joining the English against Gov. Arran. He was accused of connection with the conspiracy to murder Cardinal Beaton, and was declared a traitor and excommunicated. In 1547 he was one of the prisoners taken in the Castle of St. Andrews and exiled to France, where he wrote his 'Confession of Faith.' Recalled in 1559, he busily engaged in the establishment of the reformed faith, assisted in revising the 'Book of Discipline,' and accompanied Murray to England in connection with Darnley's murder.

Balneology. See BATHS; HYDROPATHY; HYDROTHERAPY.

Balolo, ba-lô'lô, a large Bantu nation in the Equatorial Province of the Congo Free State, inhabiting the forests on the banks of the Chuapa, Bussera, and Lomami. Its settlements are interspersed with the villages of the Batwa dwarfs. The principal tribes of the Balolo are the Boruki, Bangombe, Dulingo, Imballa, and Kimoma. Agriculture exists among them to a certain extent, but they follow no pastoral pursuits. According to V. François all Balolo tribes are addicted to cannibalism. The territories inhabited by the Balolo belong to the most promising of Equatorial Africa, especially as the climate is more favorable to Europeans than it is in many other parts of the Congo Free State.

Balsa, bál'sa, a kind of raft or float, of the nature of a catamaran (q.v.), used on the coasts and rivers of Peru and other parts of South America for fishing, for landing goods and passengers through a heavy surf, and for other purposes where buoyancy is chiefly wanted. It is sometimes formed of two inflated hides connected by a sort of platform on which the fisherman, passengers, or goods are placed; and sometimes of a very light wood.

Balsam (*Impatiens balsamina*), an East Indian herb of the natural order *Geraniaceæ*, cultivated in gardens for more than 300 years. The plant is an erect free-branching annual sometimes 30 inches tall; bears axillary, diversely tinted yellow, white, or red single or often double flowers, the latter of which are called camellia-flowered varieties. The plant is a general favorite of easiest culture.

Balsamo, Joseph. See CAGLIOSTRO.

Balsamodendron, bal-sa-mô-den'drôn, a genus of trees or bushes of the order *Amyridaceæ*, species of which yield such balsamic or resinous substances as balm of Gilead, bdellium, myrrh, etc. See BALSAM.

Balsams, mixtures of resins in volatile oils, the term, however, being popularly applied to any aromatic compound with volatile oils. Balsams are very widely distributed throughout the plant kingdom. They are particularly abundant in the members of the pine family. The arancarias yield a copal that is almost a pure resin; many species of pines yield turpentine and resin; Canada balsam is derived from *Abies balsamea*; the balsam-like sandarach is from a cypress. The *Hamamelis* family gives balsam of styrax, and balsam of caparba is derived from a large number of the legumes and from the *Dipterocarpeæ*. Styrax benzoin is from the *Storax* family. The resins and balsams of commerce are very closely allied. They may be divided into three groups: gum resins, such as asafoetida and ammoniacum; balsams, and resins, such as turpentine, resin, coparba, mastic, elemi, copal, dammar, and sandarach; and the balsams and resins that contain cinnamic or benzoic acids, from which they derive their aromatic odor. It is to this latter group that the word balsam is popularly applied. These are balsam of tolu, balsam of Peru, storax, benzoin, dragon's-blood and xanthorrhæa resin.

These various bodies are for the most part secreted in special passages in the plants. Sometimes they are formed in the leaves, but for the most part the resinous solution collects in specially designed portions of the stem, usually in the woody portion. It is obtained in a variety of ways from simple incision to boiling chips of the wood with water.

In medicine most of these bodies are active. They are energetic oxidizers,—hence the traditions about ozone and pure air in pine-clad hills,—and several of the hydrocarbons in the volatile oils are stimulating to the skin and mucous membranes, turpentine being an excellent example. It is an excellent external antiseptic, and manifests similar properties on the respiratory, intestinal, and genito-urinary tracts. Those resinous or balsamic mixtures containing cinnamic and benzoic acids—notably balsam of tolu (from *Toluifera pereiræ*) and balsam of Peru (from *Toluifera balsamum*) possess similar antiseptic and stimulating properties. They are more powerful in proportion to the aromatic acids contained. Balsam of storax is derived from a tree, *Liquidambar styraciflua*. It has similar properties to the balsam of Peru.

The chrism (see SACRAMENTS) used for consecration and sacramental services should be made of balsam from Syria or Mecca; when this is difficult to obtain, balsams from Brazil or Peru may be used.

BALTA—BALTIC SEA

Balta, bāl'ta, **Jose**, Peruvian statesman: b. Lima, 1816; d. 26 July 1872. He retired from the army with the rank of colonel in 1855; was minister of war in 1865; one of the leaders in the insurrection which overthrew the unconstitutional president, Prado, in 1868; and was president of Peru, 1868-72. He was murdered in a military mutiny in Lima.

Balta, a town of Russian Poland, on the Kodema, one of the tributaries of the Bug, in the government of Podolia, 132 miles east-southeast of Kamieniec. Pop. about 32,000.

Baltard, bāl-tār, **Louis Pierre**, French architect and engraver: b. Paris, 9 July 1765; d. 22 Jan. 1846. He was appointed architect of the Pantheon and of the Paris prisons, and designed the chapels of the houses of detention of St. Lazare and St. Pelagie. The great hall of justice in Lyons, founded in 1834, was devised and almost completed by him. He also acquired fame as an engraver and as the author of many superb works descriptive of monuments and illustrated by his own plates. Among his most notable works in this line are 'Paris and Its Monuments'; 'La Colonne de la Grande Armée'; and illustrations in Denon's 'Egypt.'

Baltard, Victor, French architect: b. Paris, 19 June 1805; d. 14 Jan. 1874. He was son of Louis Pierre Baltard, and became government architect of France and a member of the Academy of Fine Arts. He built the church of St. Augustine and other beautiful edifices, and was author of 'Monographie de la Villa Medius' (1847), etc.

Balthazar, bāl-thā'zār, (1) one of the wise men of the East who came to worship Jesus at Bethlehem. (2) A character in Eichberg's opera, 'The Doctor of Alcantara.' (3) Chaucer's name for Belshazzar in 'The Monk's Tale.' (4) The name assumed by Portia in Shakespeare's 'Merchant of Venice'; also the name of minor characters in several of Shakespeare's plays.

Baltic (bāl'tic) and **North Sea Canal**, or **Kaiser Wilhelm Canal**. See CANALS.

Baltic, **Battle of the**, a poem by Thomas Campbell, celebrating the victory of Lord Nelson over the Danish fleet, 2 April 1801. In history this action is generally known as the battle of Copenhagen.

Baltic Lake Plateau, a low plateau extending from East Prussia to Schleswig-Holstein and Jutland, parallel to the south coast of the Baltic Sea; 750 miles long. In its eastern part the highest points are the Thurmberg, near Dantzic (1,086 feet), and the Kernsdorf Mountain (1,027 feet); more to the west, in Mecklenburg and Schleswig-Holstein, the altitudes decrease and the elevations become less defined, but even the last offshoots of the plateau in Schleswig and Jutland are of importance, as they form the watershed between the basins of the Baltic and North Sea. A characteristic feature of the region is the large number of lakes and ponds, some with very irregular outlines, others occupying wide basins or narrow river-like channels. The largest of these lakes are the Müritz-See (93 square miles) in Mecklenburg, and the Spirding-See (46 square miles) in East Prussia. Many of these lakes (mostly very small) in the eastern section (Pomerania and West Prussia) are without visible outlet. According to the

most recent investigations the lake basins date from the glacial period, when a massive sheet of ice covered North Germany, the ridges and hollows of this plateau being due to the action of the ice.

Baltic Provinces (in Russia), a term generally given to the five Russian governments bordering on the Baltic, namely, Courland, Livonia, Esthonia, Petersburg, and Finland; in a restricted sense it often designates the first three. The Baltic provinces once belonged to Sweden, except Courland, which was a dependency of Poland. They came into the possession of Russia partly in the beginning of the 18th century, through the conquests of Peter the Great, partly under Alexander in 1809. No pains have been spared to Russianize them, and since 1876-7 they have lost their remaining privileges and been thoroughly incorporated in the Russian empire. They form, however, a borderland between the Germanic and Slavonic areas, and have been a frequent cause of difficulty between Germany and Russia. The bulk of the population is composed of Esths and Letts; the Germans number above 200,000, the Russians only 65,000. The five provinces combined have an area of 191,526 square miles, and a population (1897) of 7,015,126.

Baltic Sea, an inlet or gulf of the North Sea, with which it is connected by the Skagerrack and Kattegat. It washes the coasts of Denmark, Germany, Courland, Livonia, and other parts of Russia and of Sweden, and extends to lat. 65° 30' N. It is nearly 900 miles long, from 40 to 200 broad, and its superficial extent, together with the contents of the gulfs of Bothnia and Finland, amounts to 160,000 square miles. Its small breadth; its depth, amounting on an average to from 40 to 50 fathoms, but in many places hardly half so much; its shallowness toward the Prussian shores, and the rugged nature of the Swedish coasts; but above all, the sudden and frequent changes of the wind, accompanied by violent storms, render this sea dangerous for navigators, although its waves are less powerful than those of the North Sea. A chain of islands separates the southern part from the northern, or the Gulf of Bothnia. In the northeast the Gulf of Finland stretches eastward and separates the province of Finland from Esthonia. A third gulf is that of Riga or Livonia. The Kurisches Haff and the Frisches Haff are inlets or lagoons on the Prussian coast. The water of the Baltic is colder and clearer than that of the ocean; it contains a smaller proportion of salt, and ice obstructs the navigation three or four months in the year. The ebb and flow of the tide are inconsiderable, as is the case in other inland seas, the difference between high-water and low-water mark being only about a foot; yet the water rises and falls from time to time, probably owing to the varying rainfall and evaporation. In stormy weather amber is often found on the coasts of Prussia and Courland, which the waves wash upon the shore. Many streams empty themselves into the Baltic; among them are the Neva, Dwina, Oder, Vistula, Niemen, and a number of Swedish rivers. Between the Kattegat and Baltic are the large Danish islands Zealand and Funen; others in the sea itself are Samsoe, Moen, Bornholm, Langeland,

BALTIMORE; BALTIMORE FAMILY

Laaland, which belong to Denmark; the Swedish islands—Gottland and Oeland (besides Hveen in the sound, with the ruins of Oranienburg, the observatory built by Tycho Brahe); Rugen, belonging to Prussia; the Aland Islands at the entrance of the Gulf of Bothnia, and Dagoe, together with Oesel, on the coast of Livonia, all of which belong to Russia. The sound, the Great and the Little Belt lead from the Kattegat into the Baltic. The Baltic and North Sea are now connected by the great ship canal constructed between the Elbe, near its mouth, and Kiel Bay, and opened in 1895. The canal is a work of the German government, and is intended for the use of war-vessels as well as trading-ships, many of which, bound to or from Baltic ports, will be able to effect a great saving by means of this water-way. The chief sea-ports of the Baltic are St. Petersburg, Kronstadt, Riga, Revel, Narva, Libau, in Russia; Stockholm, Gefle, Karlskrona, in Sweden; Memel, Königsberg, Danzig, Stettin, Lubeck, and Kiel, in Germany; Copenhagen, in Denmark.

Bal'timore, Barons of, or Lords Baltimore. See BALTIMORE FAMILY.

Baltimore Family, founders and proprietors of Maryland, consists of seven successive lords of the barony of Baltimore in the Irish peerage, and a cadet who was governor has been added.

GEORGE CALVERT, the first lord: b. 1580, Kipling, near Bolton Castle, Yorkshire; d. 15 April 1632. He graduated from Trinity College, Oxford, 1597; traveled abroad, and after his return became secretary to Sir Robert Cecil (afterward Lord Salisbury), clerk of the Crown in Ireland, 1606, and clerk of the Council, 1608. He assisted James in his controversial writings, had charge of the Spanish and Italian correspondence during the secretary of state's absence in 1613, was on a committee to investigate Irish Catholic grievances the same year, was knighted 1617, and in 1619 was made secretary of state by Buckingham's favor. He represented Yorkshire jointly with Sir Thomas Wentworth (afterward Lord Strafford) in the parliament of 1621, and in the stormy times that followed was a mediator between Parliament and king, with the usual fate of being thought a spy by the one and lukewarm by the other. The French ambassador styled him an honest, sensible, well-intentioned man and zealous patriot, and therefore without influence. He had principal charge of the foreign negotiations while James was chasing the will-o'-the-wisp of the Spanish marriage and making England a nullity in the Thirty Years' war; Calvert's later Catholicism made him suspected as favoring the latter policy, but in fact he wished a more energetic one. On 14 Jan. 1624 he was one of the nine councilors who opposed a breach with Spain. In January 1625 he announced himself a Roman Catholic; his conversion is credited to Gondomar, the famous Spanish ambassador, and Lord Arundel of Wardour, his son's father-in-law. On 12 February he resigned his office and was given the barony of Baltimore; which, as James hated "apostasy," measures his esteem for Calvert. On the accession of Charles I., in 1625, Baltimore refused, from conscientious scruples, to take the oath of supremacy and abjuration, and

Charles gave him a handsome letter to the Lord Deputy of Ireland. In 1627 he was summoned to court to consult on the peace with Spain, but thenceforth took no part in public business, devoting himself to colonization. Already in 1621-2 he had planted a colony in Newfoundland, chartered in 1623 as Avalon; in 1627 and 1628-9 he visited it, but the severe climate disappointed him and he begged for a grant in a milder one. Without waiting for a reply he attempted to explore Virginia for a settlement; but the Jamestown officials of the old Virginia Company refused permission unless he would take the oath above. The region satisfied his ideal, however, and he persisted in asking a grant there against the dissuasions of Charles, who finally assigned him a northeastern tract, now the States of Maryland and Delaware; but the same interests delayed the proceedings, and before the charter was signed, 20 June, Baltimore died. The usual assumption that he intended the colony for a Roman Catholic establishment is not only absurd in itself, as public feeling would not have allowed it to be thought of, but is answered by the fact that the charter established the Church of England and did not even specify toleration for other creeds, which was not made a provision of law till 1649, though of course intended, and proclaimed at once on the establishment of the colony. Baltimore thought—wrongly, as it turned out—that the proprietary's power and the religion of the chosen colonists would prevent the persecution of his own faith, and had neither wish nor power to persecute others. That he meant it as an asylum and breeding-ground for his religion is a matter of course. It was also to be a feudal aristocracy, but with an assembly of freemen whose consent was necessary to the validity of laws. In a word, Baltimore was a conservative of high principles and moderate temper.

CECILIUS, or CECIL CALVERT, the second lord: b. about 1605; d. 30 Nov. 1675. He married Anne Howard, daughter of Lord Arundel of Wardour (after whom Anne Arundel County of Maryland is named), about 1623. The charter of Maryland granted to his father was transferred to him as heritor; but he never visited it during the 43 years of his life thereafter, sending deputies in his place, and managing its business and political affairs judiciously from England, settling disputes of natives or colonists sensibly and placably, and esteemed a worthy successor to his father. Down to the civil war of 1642 he had little to do but support his brother, Leonard, as governor; but his policy then became difficult. He tried to steer a middle course, and avoid either for himself or the colony any pronounced declaration of sympathies or allegiance which might expose it to confiscation; but Ingle's upset of the colonial government (see **LEONARD CALVERT**), and the parliamentary triumphs at home, showed him at last that this could not be maintained, and that with the Puritans at the head, the Roman Catholic supremacy, though used only to preserve themselves from persecution, must be given up. On 9 June 1647 Leonard died, after appointing as his provisional successor an ardent Churchman and loyalist, Thomas Green; but Lord Baltimore in 1648 appointed Capt. William Stone and had him settle some 500 Puritans, harried by the Vir-

BALTIMORE

ginia Cavaliers, in Maryland. When the news of the king's death arrived, Green, in Stone's absence, proclaimed Charles II. king, as did Virginia; on which William Claiborne (q.v., and below), the treasurer of Virginia, joined the Parliamentary party, obtained a commission to reduce the two rebellious provinces, and, after overthrowing the Virginia government, forced Gov. Stone to renounce his allegiance to Lord Baltimore and give it to the "keepers of the liberties of England." When Cromwell dispersed the Long Parliament Stone repudiated the agreement; Claiborne marched against him, deposed him, and appointed a Puritan government which at once most ungratefully disfranchised all Catholics and repealed the colonial toleration act of 1649. In January 1654 Cromwell himself intervened, and forbade the Virginia authorities to molest Lord Baltimore or his officers in Maryland. Baltimore thereupon ordered Stone to overturn the Puritan government, but Stone's force was defeated and himself captured. Baltimore, however, kept his favor with the Puritan administration; the commissioners of plantation decided that the province was his, and in 1658 it was restored to him. Claiborne's influence was at an end, and Baltimore had no further troubles over Maryland.

LEONARD CALVERT, younger brother of Cecilus, was sent out by the latter as first governor of the new colony: b. about 1606; d. June 1647. He set sail 22 Nov. 1633, in the Ark and the Dove, with about 200 Roman Catholic settlers of good families; arrived 24 Feb. 1634, at Point Comfort, landed 25 March on an island in the Potomac, which they named St. Clement's, and founded on the site of an abandoned Indian village a town, St. Mary's, long since deserted. He met an Englishman, Capt. Henry Fleet, who had lived some years among the Indians, and helped him to gain their consent to the settlement. But he found Kent Island in the Chesapeake, the great island opposite Annapolis, settled by one William Claiborne (q.v.), under a grant from the dissolved Virginia Company, effectively enough to have a representative in the Virginia legislature. Calvert claimed right of property and political jurisdiction over the island, Claiborne denied both, and Virginia upheld him; and the warfare that ensued embroiled the two colonies for many years, complicating itself with the issue of Churchmen against Catholics, then (by the oddest irony of fate) with Cavaliers in Virginia against the Puritans who had overborne the Catholics in Maryland, and finally with a rankling boundary dispute. Claiborne poisoned the Indians' minds against the Marylanders as a set of treacherous Spaniards; Calvert sent an expedition against him, which captured two boats, with mutual loss of life, in April and May 1635. Claiborne had further losses, and became bankrupt, but in 1637 bought of the Indians Palmer's Island, at the head of Chesapeake Bay, as beyond Baltimore's grant, and petitioned for an injunction against Baltimore's interfering with him. The commissioners of plantation refused him the grant, despite his purchase, on the ground that he had only a trading license. Meantime Kent Island continued insubordinate, and Calvert had to make an expedition against it in person, reducing it and occupying Palmer's Island also, and capturing one of Claiborne's

lieutenants, who was put to death for piracy and murder in the former troubles. Calvert now undertook to introduce the feudal system contemplated by his father's charter; but as the freemen's consent was necessary to this, and they refused to give it their own abasement, the scheme was blocked and in fact never was carried out. The civil war of 1642 having broken out, cautious steering was needed to avoid risking confiscation from one side or the other, and Calvert went to England to consult his brother, leaving one Brent as deputy; who brought on the very catastrophe dreaded, by seizing a Parliamentary vessel and imprisoning the captain, Richard Ingle. Ingle escaped, obtained letters of marque from Parliament, allied himself with Claiborne, who had been made the treasurer of Virginia for life by the king, but had no politics except for his own hand, and by the time Calvert returned with a new commission in 1644 had possession of the colony and was plundering right and left. Calvert, in an attempt at repossession, was defeated and fled to Virginia, which had remained loyal to the king, and appealed to the colonial government for help; they refused to give it; finally he got a force together, and in December 1646 returned and drove Ingle out—one of the flying rebels, however, carrying off all the early records of the colony, which have never reappeared. He died the next year, leaving an unfortunate provisional appointment of a successor, which made even worse trouble for the colony than the last deputy.

JOHN, the third lord; CHARLES, the fourth; BENEDICT, the fifth; CHARLES, the sixth; and FREDERICK, the seventh and last, complete the roll. Frederick was a foolish and worthless rake, and perhaps worse. Born in 1731, he died 14 Sept. 1771, leaving no legitimate heirs, but apparently a natural brood of some ability. The proprietary rights in Maryland were bequeathed to a child, Henry Harford, but four years later were rendered worthless by the Revolution.

Baltimore, Md., the chief city of the State, the sixth in population of the United States, and the commercial head of the Atlantic seaboard south of New York. It stands at the head of navigation and tide-water on the Patapsco River, 14 miles from its mouth at Chesapeake Bay and 200 from the Atlantic Ocean on the Pennsylvania (P, W. & B), Baltimore & O, W. Maryland, Baltimore & P, Northern Cent., and other R.R.'s; 38 miles northeast of Washington, 97 southwest of Philadelphia. Pop. (1900) 508,957; estimated (1903) 600,000. The Patapsco, properly a small stream south of the city, is a three-branched estuary, of which the northwest and middle branches pierce a group of low hills on which the city is built, and embrace a forked peninsula with Fort McHenry (famous for the origin of the "Star-Spangled Banner") guarding the harbor from the north fork. The northwest branch is the real harbor, on which the city first grew and around which it is situated; it is 3 miles long and $\frac{3}{4}$ of a mile wide in greatest width, the western end being a narrow inner basin, suddenly widening at the east to an outer harbor with a minimum depth of 24 feet; again narrowing to $\frac{1}{4}$ of a mile at Fort McHenry, beyond which the Patapsco is a bay several miles wide, with a 27-foot channel.

BALTIMORE

The harbor is really the separate estuary of a small stream called Jones Falls, which flows through the heart of the city. It formerly alternated between an almost waterless bed of noisome mud and a furious and destructive torrent, but is now restrained by stone embankments, and is fed in drouth from the Gunpowder River reservoirs to the north. Its valley in the northern part of the city is a great track-yard for the railroads approaching the Union station, and is spanned by numerous long and handsome steel bridges. The middle branch in like manner is the estuary of another small stream, Gwynn's Falls, which practically bounds the city west and southwest.

Baltimore covers about 32 square miles or over 20,000 acres; and has about 400 miles of streets, four fifths of them paved with cobblestones. It is laid out in a general rectangular form, kept from monotony not only by the picturesque variety of hill and hollow, but by the differences in plan and general direction of the original settlements joined to make up the present great city, or since annexed by it. Especially in the older portion, east of Jones Falls, there are several avenues radiating from the river at different angles; and Fremont Avenue on the west side is also a long street of this character. The business heart is west of Jones Falls; east of it is Old Town, with Fells Point, famous for shipbuilding, south on the harbor. The chief business street is West Baltimore (which as East Baltimore Street crosses the river through the Old Town); next in importance are Lexington Street, parallel to it on the north, and Calvert Street, north and south of Monument Square in the centre of the city (the core of the wholesale dry-goods district), also a residence street. Other notable ones are Calvert and North Calvert streets (north of Jones Falls), and Howard Street (north and south of the Baltimore & O. R.R.). These names commemorate the Calverts, the Lords Baltimore, who founded Maryland, and Col. John E. Howard, who gave the ground for Washington monument. The finest residence section is the northwest. The general impression of the city is that of solid blocks of low-red brick dwellings, the better ones with white marble doorstones and facings; and business and institutional buildings of the latter, beautiful in itself and in the architectural uses made of it. A favorite construction, peculiar to this city, is rough marble ashlar used with polished marble. The newer business buildings and the dwellings in the new quarters, however, are varied in material and design. The brick is from the inexhaustible beds of fine clay near by, the marble from quarries about 10 miles north, the granite from about 15 miles south.

Public Buildings and Monuments.—Baltimore was long ago named "the Monumental City" from its two noted landmarks, the Washington Monument in Mount Vernon Place, and Battle Monument in Monument Square, both of white marble. The former is a Doric shaft 180 feet high, including a pedestal of 50 feet, with a colossal statue of Washington on the top; 220 winding steps lead to the summit, whence is had a magnificent view of the city and vicinity. It was begun in 1816 and completed in 1830. Around it are the statues of Chief Justice Taney and George Peabody (a bronze by W. W. Story), and a number of superb animal

bronzes by Barye. The Battle Monument, 52½ feet high, was erected to the slain defenders of Baltimore against the British in 1814. Other heroes of the War of 1812 are commemorated by the Wells and McComas monument; those of the Revolution by the Sons of the Revolution monument. The Wilkey monument on Broadway, 52 feet high, is to the founder of the Odd Fellows' order in America; the Ridgely in Harlem Square, to another prominent Odd Fellow. Greenmount cemetery has one to John McDonogh, the eminent philanthropist (see *Charities*). Besides churches, the most prominent buildings architecturally are the white marble city hall, occupying an entire square of above half an acre, 355 feet long, Renaissance style, four stories high, with an iron dome and tower rising 260 feet from a marble base, and a fine interior, but built for its original estimate of \$2,600,000; the city court-house, completed in 1890, housing all courts but those of the United States, containing also the land records and the Barr Association library; the United States court-house; the Peabody Institute; the Enoch Pratt Free Library; the Masonic Temple; and the splendid Romanesque Maryland Club House—all of white marble; the custom-house, 240 feet by 141 feet, with a glazed dome 115 feet above the street, and with colonnades around it, each column a single block of Italian marble; the post-office; the jail, of granite; the Maryland Institute, of brick, 355 feet long; the Odd Fellows' Hall, of brick; the Johns Hopkins Hospital; the Mount Royal station of the Baltimore & O. R.R.; and the Garrett mansion of brownstone, a palace worthy to compare with many European ones. There are also several fine business buildings.

Churches.—Owing to Maryland's foundation as a Roman Catholic colony, and that element being long predominant and always powerful, Baltimore was the first see of that Church in North America. It is the seat of an archbishop, who is the primate of the United States. Its cathedral is an interesting building architecturally and historically; it is a massive granite structure, 190 feet long, 177 broad, and 127 high, and contains among its adornments two fine paintings presented by Louis XVI. and Charles X. of France. It dates from early in the 19th century. Besides the cathedral there are 42 Roman Catholic churches and 30 chapels, the most notable church buildings being those of St. Alphonsus and Corpus Christi, or the Jenkins Memorial. The Protestant denominations have about 200 church buildings. The Church of England erected its first church in 1731, and the Presbyterians their first in 1756. The first Methodist Church was organized in 1773, the first Baptist in 1780, and the first Quaker meeting-house was opened in 1781. The most notable Protestant church buildings are: Episcopal—Grace, Christ, and St. Peter's; Presbyterian—Westminster, First, and Brown Memorial; Methodist—Mount Vernon; and the Unitarian. Baltimore has also six Jewish synagogues, two of them of great beauty—that on Madison Avenue, and the White Temple on Eutaw Place.

Clubs.—The Maryland Club is the great social organization of Baltimore's leading citizens; it occupies a superb new building (1893) on Charles and Eager streets. The Baltimore Club, with a brownstone building on Charles

BALTIMORE

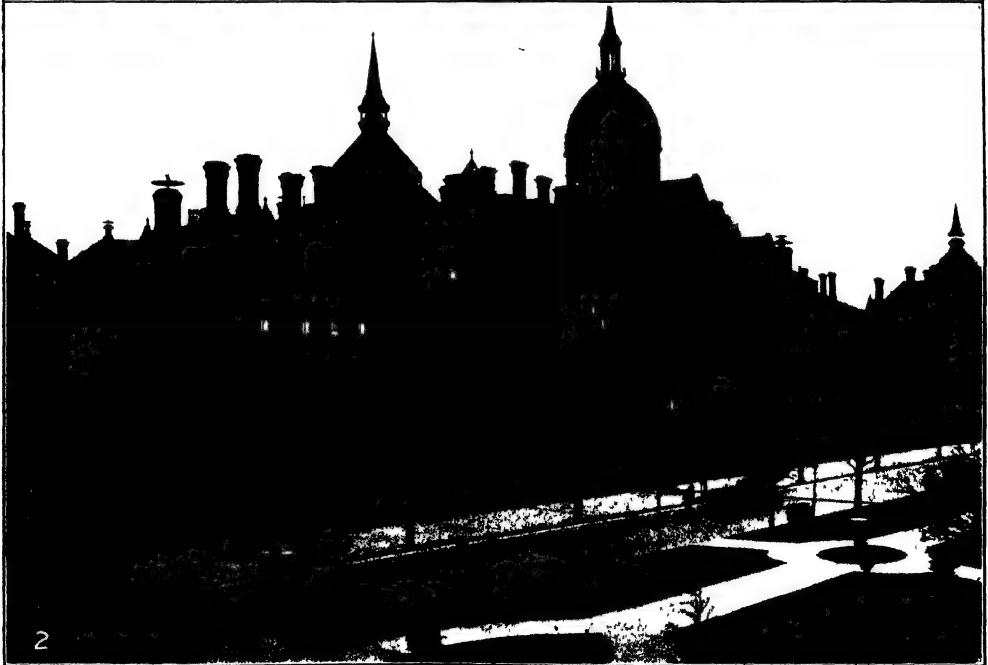
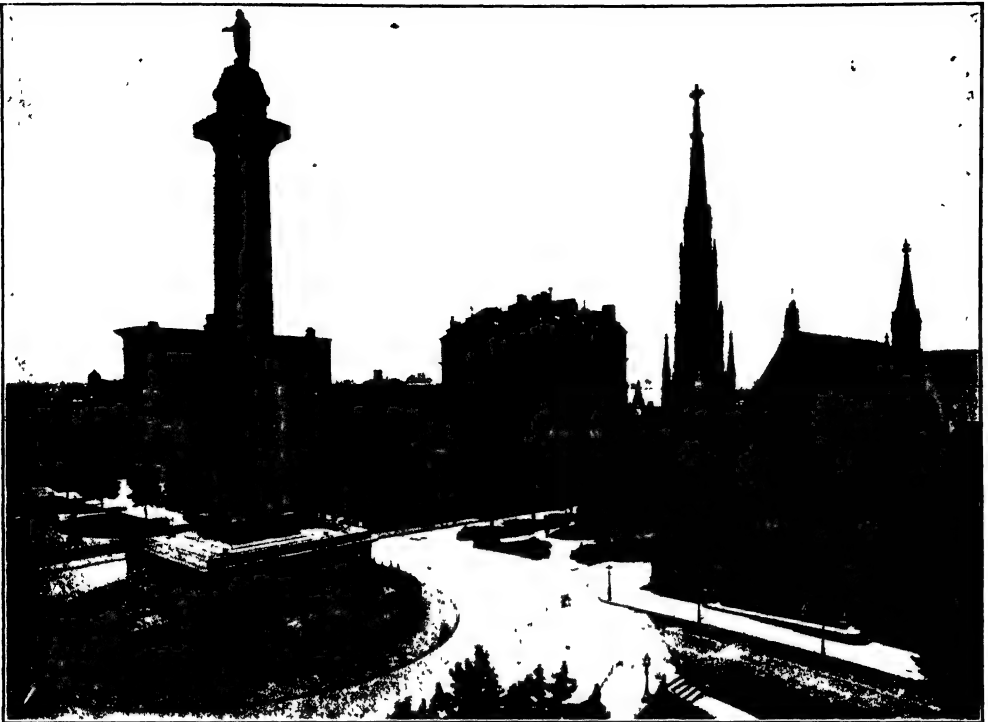
Street, opposite, was a secession of exclusively the sons of old Maryland Club members, on the issue of barring out treating and gambling. Others are the Phoenix, the Athenæum, Merchants', University, Catholic, and Germania (of German-Americans).

Educational Institutions, Art Galleries, and Libraries.—The most famous institution of learning in Baltimore is Johns Hopkins University (q.v.), opened in 1876, a post-graduate system which has lifted American instruction to the highest European level, so that foreign scholars come here as regularly as ours go to England and Germany, and the Johns Hopkins diploma ranks with that of any European university. It has also a medical school of equally world-wide distinction; and the Johns Hopkins Hospital is by deed a great clinic for it, as well as a training-school for nurses. Other medical schools are those of the University of Maryland (1807), the College of Physicians and Surgeons, and the Baltimore Medical College. The oldest dental college in the world is the Baltimore College of Dentistry and Surgery, chartered 1839. The chief law school is that of the University of Maryland. There are also many other colleges and preparatory schools of good rank, making the city a leading educational centre. Among these are Morgan College (Methodist Episcopal, 1876); the Woman's College of Baltimore (Methodist Episcopal, 1888), with a preparatory school in connection; Baltimore City College; Bryn Mawr School (1885); and four Roman Catholic institutions—St. Mary's (Seminary of St. Sulpice, 1791); Loyola (1852), under Jesuit management; Notre Dame of Maryland (1873); St. Joseph's (1888). The public school system has about 185 schools, over 1,800 teachers, and about 65,000 pupils, and about \$1,200,000 is annually expended in its support. The first manual-training schools for white or colored pupils were established here. There is also a State normal school and an institution for training colored teachers. The Maryland Institute of Art and Design is what its name implies; and the Peabody Institute gives lecture courses and includes a school of music as well as a great library and art galleries. Enoch Pratt, the founder of the Free Library, gave the Academy of Sciences a home in 1895. The Walters Art Collection, although the private property of the heirs of a great connoisseur, admits the public for part of the year, by the terms of his bequest. It is one of the most complete collections in the world of modern French and Spanish paintings, etchings, water-colors, ceramics, bronzes, etc. Each great educational institution and learned society has its own library. The chief of these is that of the Peabody Institute, with about 150,000 volumes. The Maryland Institute, Maryland Historical Society, and the Maryland Episcopal Diocese have theirs also; the Bar Association has its library in the city courthouse. The first free circulating library in the city was founded in 1886 by Enoch Pratt, a Baltimore merchant of New England birth, who gave it a building and a fund of \$833,333.33, on condition that the city should expend \$50,000 annually upon it. It has seven branches and over 200,000 volumes. There are also the Archbishop's, Odd Fellows', New Mercantile, Baltimore & Ohio Employees' Free Circulating, and other libraries.

Charitable Institutions.—The most splendidly endowed is the Johns Hopkins Hospital, which in 1873 received half of Johns Hopkins' fortune (over \$2,000,000), and was made a clinic for the medical school of the university, for which it has great laboratories. It occupies 13 acres and has 320 beds. The buildings were erected from the income of the bequest, the principal as yet remaining untouched. Others are the Maryland University Hospital, the City Hospital, and St. Joseph's Hospital. The Sheppard Insane Asylum, founded in 1890, had its endowment more than doubled in 1898 on condition of changing its name to the Sheppard and Enoch Pratt Hospital, and is the best endowed insane retreat in the United States. The Spring Grove Insane Asylum is a State institution accommodating about 300 patients. There are also the Maryland Institution for the Blind, with a beautiful white marble building accommodating about 50 patients; the city almshouse, called the Bay View Asylum, 1,714 feet long, with room for 500 inmates; the St. Mary's Industrial School and the House of Refuge for juvenile offenders; the McDonogh School for indigent children, endowed by John McDonogh, the Wilson Fund giving to poor children summer outings on the bay or at the Wilson sanatorium on Mount Wilson; the Samuel Ready Asylum for Female Orphans; and the Day Nursery.

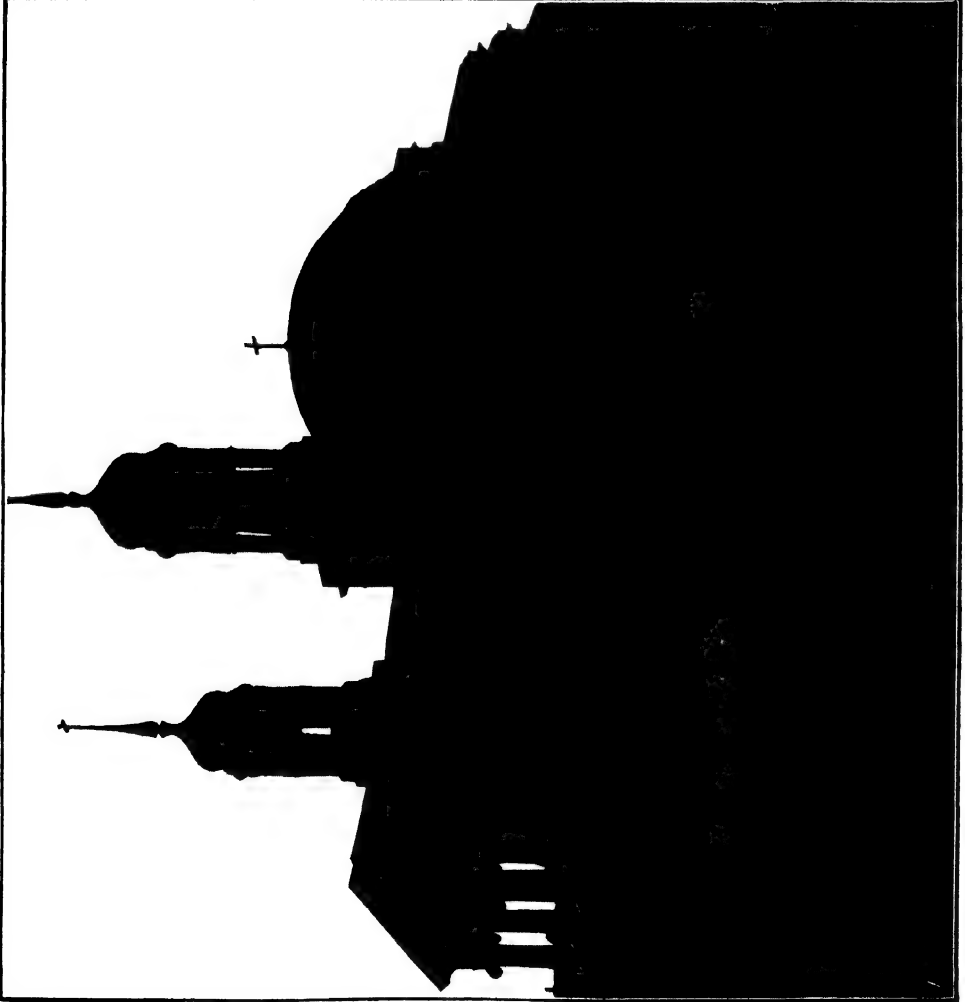
Parks and Cemeteries.—The park system, purchased and maintained out of a franchise tax on the street railways of the city, which yields over \$200,000 a year, is one of the most extensive in the country. It includes about 1,250 acres of ground, and comprises playgrounds, fields for athletic exercises, comfort buildings, etc. The largest is Druid Hill Park on the north, unsurpassed in the United States for varied and unspoiled natural beauty improved by art; 671 acres of hill and dell, forest, ponds, and lawns, Prospect Hill commanding a wide view. It is named from its noble old oaks; was formerly the seat of the Rogers family, is still by deed their burying ground, and contains their mansion house. It has 16 miles of fine drives, including the fashionable drive of Baltimore, of one and one half miles around Druid Lake on the southern border, an artificial pond nearly three quarters of a mile long, a part of the city water-works. The park contains also flower-gardens, conservatories, and palm-houses; a zoological museum; the historical museum in the Maryland building at the Centennial Exposition of 1876 in Philadelphia, afterward moved hither; and the Wallace statue. The next largest is Clifton Park on the northeast, of 255 acres, the old Johns Hopkins estate, acquired by the city in 1895; there are also Patterson Park of 106 acres, in the Old Town near the harbor, with fine conservatories; Carroll Park on the extreme west, a part of the estate of the famous Carrolls of Carrollton, and containing their old mansion. South Baltimore has also Riverside Park of seven acres, and Federal Hill Park of three, the latter overlooking the basin. Highland Park is in the extreme northwest. There are two "schützen" parks, one on the northeast near Clifton Park, the other in the southwest; and many public squares, some with monuments. Around Battle monument are four open squares. There are several large and finely

BALTIMORE.

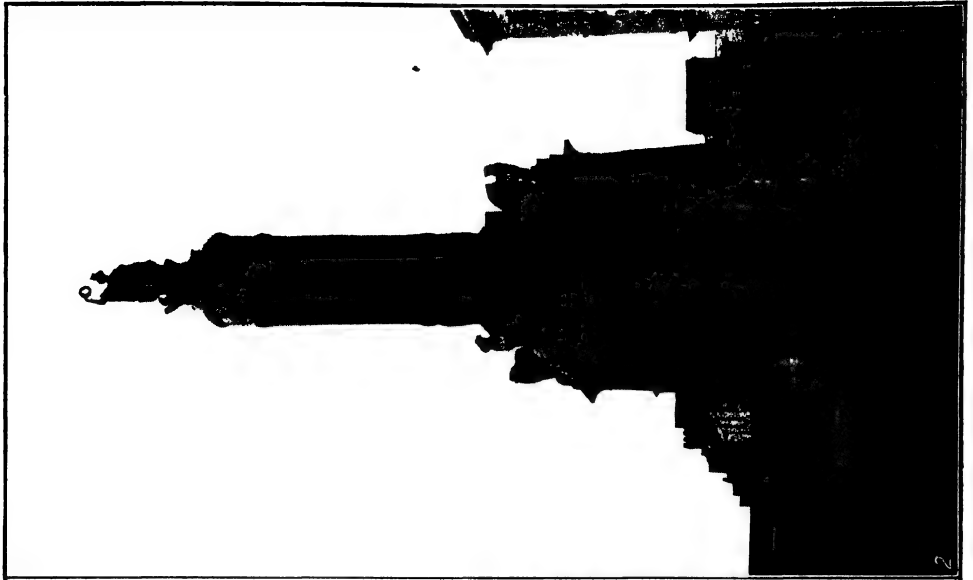


1. Washington Monument.
2 Johns Hopkins Hospital.

BALTIMORE.



1. Cathedral.



2. Battle Monument.

BALTIMORE

kept cemeteries; the largest is Baltimore cemetery, in the extreme northeast near Clifton Park; the most beautiful are Greenmount in the north centre, containing the McDonogh monument, and Loudon Park in the extreme west. Near the latter is Mount Olivet. St. Peter's (Roman Catholic) is on the northwest.

Water Supply, Fire Department, etc.—The water supply, formerly obtained wholly through Lake Roland, an artificial pond seven miles north of the city fed from Jones Falls, and very pure water, was supplemented in 1881 from Gunpowder River, about 11 miles north, through a tunnel 7 miles long and 12 feet in diameter. There are eight reservoirs, with a total capacity of 2,240,000 gallons, and 620 miles of mains; and the average flow of all the streams is 165,000,000 gallons a day. There are about 1,000 fire-plugs, 23 steam fire-engines, and 9 hook-and-ladder companies.

Trade, Commerce, Manufactures, and Transportation.—Baltimore, as the head of navigation on the great land-locked gulf of Chesapeake Bay, the Baltic of the middle United States, lying on the border of North and South, and therefore the natural distributing point for their products and manufactures, also as the most convenient port for the Ohio valley and adjacent parts, was destined by nature for a great commercial future of both domestic and foreign trade, and early became the focus of the great central highroads from the west. For the stages of its development see *History*, following. A curious advantage of its harbor is that its waters do not feed the *teredo* or timber-worm. When its first source of prosperity, the great "clipper" sailing commerce, began to decrease, it was fortunate in having new sources opened by the exploiting of coal and iron near by, for manufactures and shipping, and the accessibility of great forests for the lumber trade, and canals and railroads gave it as good internal communications as the bay afforded external ones. It built up new markets in South America, and of late years has regained much of its European importance. While in 1890 it was sixth among American cities in foreign trade, in 1900 it was third, second in exports, and fifth in imports; in 1901-2 its exports were \$106,239,081. It has more than a dozen steamship lines running regularly to all the leading English and Continental ports; three of the great transatlantic lines, the Norddeutscher Lloyd, the Hamburg-American Packet Line, and the Red Star (Antwerp) ply regularly from here. Besides these it has steamship lines to Boston, Halifax, Providence, New York, Wilmington, N. C., Charleston, Savannah, New Orleans, etc.; and steamboat lines to Philadelphia, Washington, Norfolk, Richmond, and other points on the bay and its tributaries. There are 8 or 10 coasting lines on the bay alone, chief of them the Old Bay Line to Norfolk. In 1902, 897 vessels of 529,118 gross tons cleared from the port of Baltimore for foreign ports, 380 sailing-vessels of 64,275 tons, and 517 steamers of 464,843 tons; and about 2,300 for American ports. The Delaware and Chesapeake ship canal, across the narrow strip of Delaware, gives it a direct water outlet to Philadelphia. Its railroads have already been mentioned. The Baltimore & Potomac has a tunnel 7,400 feet long through the west side of the city; the

Northern Central one 3,500 feet long through the northeast; the Baltimore & Ohio one 1 $\frac{2}{3}$ miles long through the city north to south. The Baltimore & Ohio road draws its trains through by electric motors. The huge grain-elevators of the Pennsylvania system are at Canton on the north side of the harbor, those of the Baltimore & Ohio Company at Locust Point on the south. Baltimore is the foremost corn-exporting port in the country, handling an average of 40,000,000 bushels a year, with 20,000,000 of other grain; one of the first in flour, handling about 3,500,000 barrels; it also sends out enormous amounts of other provisions, live stock, tobacco, boots and shoes, coal, naphtha, drain-pipe, copper (\$16,000,000 worth in 1900), etc. Its imports are copper (mainly to be re-exported), iron and manganese ores, cotton, coffee, West India products, etc. A leading industry, both of direct shipping and of preparation in its canneries, is that of oysters, in which it is first of the world. Its volume is seven to eight million bushels a season, from 1 September to 1 April, sending off sometimes 50 or 60 car-loads a day; the trade with the eastern shore of Maryland alone amounts to some 8,000,000 a day. Its canneries of fruit and vegetables are also of the first importance. Of other industries, that of iron and steel in Baltimore and vicinity has more than doubled during the last decade. The Maryland mines formerly produced charcoal pig-iron of a high grade, and the furnaces, rolling-mills, etc., later developing into armor-plate manufactories and steel works, were of great extent; but for a time the discovery of the Lake Superior ores drew the industry westward, and the chief Baltimore works were abandoned. In 1887, however, an epoch was made in this industry in the United States by the location at Sparrow Point, some miles down the Patapsco, of the great works of the Maryland Steel Company, costing some \$8,000,000, and importing the ores largely from Cuba, with some from Mediterranean ports; the coal and coke coming from Pennsylvania and West Virginia. Baltimore was formerly a great centre of wooden-ship building; iron ships for a time crippled this business, but of late there has been a revival of building the latter, including several vessels of the new navy—greatly aided by an immense dry-dock capable of receiving the largest vessels. Flour-milling is another heavy industry, one firm turning out over 2,000 barrels a day. Textile fabrics rank high; especially, it makes 80 per cent of all the cotton duck manufactured in the United States, and 60 per cent of all in the world. The volume of its leading industries as given by the census of 1900 was as follows, besides bread, shirts, carpenter and mason work, etc.: men's factory-made clothing, \$17,290,825; women's factory-made clothing, \$2,506,654—total clothing \$19,797,479; tobacco products, \$9,576,455; canning of fruits and vegetables, \$8,477,178; canning of oysters, \$2,364,968—total canneries, \$10,842,146; foundry and machine-shop work, \$6,119,973; slaughtering and meat-packing, \$5,308,334; fertilizers, \$3,752,328; malt liquors, \$2,934,028; furniture, \$2,690,610; confectionery, \$2,249,858; lumber and planing-mill products, \$1,809,868. The total number of manufacturing establishments is 6,359; capital invested, \$117,062,459; average number of wage-earners, 78,738; total wages,

BALTIMORE

\$29,220,460; cost of materials, \$87,175,134; value of products, \$161,249,240.

Finances, Banking, etc.—The assessed property valuation is about \$430,000,000, the net debt about \$33,000,000, and the tax rate about \$21.50 per \$1,000. The municipal expenditures are about \$8,000,000, of which \$1,575,000 is interest on debt, \$1,500,000 for schools, \$875,000 for police, and \$450,000 for the fire department. There are 21 national banks, with a capital of about \$11,750,000, and surplus of about \$4,500,000. The clearing-house transactions amount to \$1,202,000,000 a year. There are also a large number of State and private banks, loan and trust companies. The city has over \$100,000,000 invested in southern loans. It is the great United States centre of the fidelity and security business; its security and trust companies have an aggregate capital of \$21,650,000, and a surplus of over \$17,500,000.

Government.—By the revised charter the mayor holds office for four years; he has a veto which can be overridden by a three fourths vote of the council, which is composed of two branches: the lower, of 22 members, one from each ward; the upper, of 11 members, each from two contiguous wards. The bulk of the city officers are appointed by the mayor with the consent of the higher branch. In 1895, when a Republican mayor was elected after Democrats had held unbroken control of the city for 28 years, the Democratic council passed a resolution over the mayor's veto, transferring his power of appointment to themselves; but the Maryland court of appeals decided that they had exceeded their authority. The council has the right to appoint the city register and public printer; and the comptroller and surveyor are elected by popular vote.

Population.—The following are the figures from the first census to the last:

1790	13,503	1850	169,054
1800	26,514	1860	212,418
1810	46,555	1870	267,354
1820	62,738	1880	332,313
1830	80,620	1890	434,439
1840	102,313	1900	508,957

Except in 1850, when it stood third in population, it has varied from fifth to seventh in the United States. In 1900 the female population exceeded the male by 22,397. There were 440,357 native-born inhabitants against 68,600 foreign-born, over one half being Germans. Though nominally as much northern as southern, the city has always been southern in character and sympathies, owing to the large negro population; in 1900 this was 79,258, or nearly one sixth, and had increased by almost exactly one half since 1800. The only American city with a larger colored population is Washington. The death-rate in 1890 was 22.9 per 1,000, in 1900 21 per 1,000; but a peculiar feature well known to life-insurance companies is disclosed by the fact that the death-rate among the whites was only 19 per 1,000, but among the colored 31.1.

History.—John Smith, in 1608, made two voyages up Chesapeake Bay and its inlets of which he made a map. He was one of the first Europeans to explore this section. Cole's Harbor was named in 1668, changed in 1700 to Todd's Range, and in 1706 to Whetstone Point. The first land taken up was by Charles Gorsuch, a Quaker, who was granted 50 acres of land

here in 1662; David Jones settled on Jones Falls in 1682. In 1729 the General Assembly tried to locate a town south of the harbor, but were induced by the owner, who imagined there were iron deposits there, to change it to the north side; this was done 8 August, and in January 1730 it was so laid out west of Jones Falls. The same year a ship-carpenter, William Fells, settled at Fells' Point; in 1732 another town was laid out east of Jones Falls and called Jones Town (now the "Old Town" of Baltimore, the original Baltimore being the "New Town"). In 1745 this and Jones Town were consolidated as Baltimore; but even in 1752 it contained only 25 houses. In 1756, however, a colony of the deported Acadians settled near by, and in 1765 it had 50 houses and about 600 people. In 1767 the county-seat, which had been at Joppa since 1712, was removed to Baltimore, and a court-house built where Battle monument now stands. In 1773 a stage line to Philadelphia and New York was started, and the first newspaper,—*The Maryland Journal and Baltimore Advertiser*,—was issued 30 August; it suspended in 1797, and the first surviving one, the *American*, began 14 May 1799. The first theatre performances were given in 1773; the first theatre building was erected in 1781, and opened 15 Jan. 1782. In 1775 Baltimore had 564 houses and 6,755 people and had become an important port. The Revolution brought it prosperity by crippling its rivals, and it was a great seat of privateering. For a couple of months in 1776-7 Congress held session in one of its taverns, having fled from Philadelphia in fear of the English. In 1780 a custom-house was established, and in 1783 wardens of the port were appointed, though it had but one public wharf, and only three private ones extended over 200 feet. In 1784 a market was opened, the streets were lighted with oil lamps, and watchmen were appointed. About this period the energy and resources of a couple of immigrant Scotch-Irishmen, the brothers John and Henry Stevenson, began to push the place forward; new stage and packet lines were established, the roads improved and turnpikes laid out, and Jones Falls diked and part of its course filled in. The population doubled in the 15 years from 1775 to 1790, and then began a time of still greater prosperity. The European wars of the French Revolution and later threw a large part of the world's carrying-trade, till Napoleon's downfall, into American hands; the "Baltimore clippers" were famous everywhere, and the city nearly doubled again in the decade to 1800. In 1792 a large body of French refugees from Haiti came in. On 31 Dec. 1796 the old settlement at Fells' Point was united with it, and it received a city charter, it having previously been governed from Annapolis. In the War of 1812 it again became a seat of privateers, in revenge for which the British attempted its capture in 1814, but the attack was repulsed 12 September. To it we owe the "Star-Spangled Banner" (see KEY, FRANCIS SCOTT) and the Battle Monument. The end of the Napoleonic wars in 1815, restoring to England her old carrying trade, was a heavy blow to Baltimore; and though it built up some new South American trade the glory of the clippers departed. In 1817 it was first empowered to borrow money, a privilege it liberally utilized. In 1828 the public-school sys-

BALTIMORE COUNCILS — BALUCKI

tem was established. The same year work was begun on the Chesapeake and Ohio Canal, and on the Baltimore & O. R.R., and next year the Baltimore & S. R.R. was begun. Manufactures now began to develop largely.

In 1860 all three anti-Republican parties held their national conventions there; and on the outbreak of the Civil War the Union troops passing through there were mobbed by the citizens, and the first blood of the war was shed in its streets, 19 April 1861. On 13 May Federal Hill was occupied by a Union force, and the city remained under martial law till the end of the war. The convention of 1864, which re-nominated Lincoln, was held here. In 1888 "The Annex" was annexed to the city, extending its limits two miles north and west, and nearly doubling its size. Since 1890 Roland Park and Walbrook have also been annexed.

On Sunday, 7 Feb. 1904, fire destroyed the greater part of the business portion of the city. Eighty blocks of buildings, embracing nearly all of the finest public and private business structures, were burned. The loss was \$125,000,000. On account of the number of financial institutions involved, the governor convened a special session of the legislature, and the Federal troops having taken possession of the burnt district, martial law was proclaimed for one week.

WILLIAM F. WHEATLEY.

Baltimore Councils. See CATHOLIC CHURCH.

Baltimore Oriole. See ORIOLE.

Baltistan, bāl-te-stān', or **Little Tibet**, an elevated plateau through which the upper Indus flows. It lies below the Kara-Korum Mountains and the Himalayas, with a mean elevation of 11,000 feet, and contains the nameless peak marked K², 28,278 feet high, next to Everest, the highest on the globe. It is politically a part of Kashmir, and the inhabitants are of Mongolian stock.

Baluchi, ba-loo'chē, the language of Baluchistan, one of the Iranian group of languages. There are two dialects, the North Baluchi, and the South Baluchi, or Maprani; the latter shows more ancient features. The literature is not important, though recently collections have been made of popular songs and legendary stories.

Baluchistan, bā-loo'che-stan', a country in the south of Asia, lying between Persia and the valley of the Indus, having the former on the west, Afghanistan on the north, Scinde on the east, and the Arabian Sea on the south; area, about 134,000 square miles. It is wholly under British influence and partly under British rule, while the Khan of Kelat is ruler of a considerable portion, and certain tribes are independent. The general surface of Baluchistan is rugged and mountainous, with some extensive intervals of barren sandy deserts. In the case of the principal ranges, the general parallelism and uniformity of their formation are somewhat remarkable, one system having an inclination from north to south, another from east to west. Many of these mountains are of great height and are covered with snow. There are several broad and high table-lands, extremely cold in winter and extremely hot in summer. Mekran in the south, the ancient Gedrosia, is one of the hottest regions of the globe. Some of the mountain chains are of compact limestone, enclosing marine shells and corals identical with similar objects picked up on the sea-shores at

this day. Excepting fragments of quartz found in Lus, primary formations have not been observed in any part of the Baluchistan Mountains. The mineral wealth of the country is believed to be considerable, including gold, silver, lead, iron, copper, many kinds of mineral salts, and saltpetre. Throughout Baluchistan there is a great deficiency of water, particularly in summer. In the northeast part are the rivers Bolan and Mula, the courses of which form the celebrated passes bearing their names, leading from the valley of the Indus to Baluchistan and Afghanistan. The soil is not in general fertile, but by patient industry the plains and valleys can be made productive in wheat, barley, and millet. The other chief crops are madder, cotton, particularly in Cutch Gundava, rice, indigo, and tobacco. Vegetables are abundant, and excellent fruits are produced in the gardens and orchards in the neighborhood of the towns. Fine camels are bred in large numbers.

The inhabitants are divided into two great branches, the Baluchis and the Brahuis, different in their languages, figures, and manners, and each subdivided into a number of minor tribes. The Brahuis have greater physical strength than the Baluchis, and are less addicted to predatory violence. Both races are hospitable, brave, and capable of enduring much fatigue. Many of them live in rude tents made of black felt or coarse cloth of goat's or camel's hair stretched over a frame of wickerwork. Both Baluchis and Brahuis are very ignorant but zealous Mohammedans. The Baluchi language resembles the modern Persian, the Brahui presents many points of agreement with the Hindu. The manufactures are mostly confined to coarse fabrics and a few matchlocks and other weapons, and the trade is unimportant. The khan, so far as his rule extends, has unlimited power over life, person, and property. He usually resides at Kelat, and his rule is almost confined to the country around it. Quetta is the largest town. It is occupied by a British garrison and strongly fortified.

About the middle of the 18th century Baluchistan was made tributary by Nadir Shah, who bestowed it, with the title of *beglerbeg*, or commander-in-chief, on Nasir Khan, who proved himself the ablest ruler that ever governed the country. On his death in 1795 he left the country in a comparatively prosperous condition, but it has since suffered greatly from intestine wars, and its boundaries have been curtailed. During the Afghan war in 1839 a British force was detached to assault Kelat, which was taken by storm after a siege of a few hours, 13 November the same year. The British again occupied it in 1840, but in the following year they left the country. Latterly a British protectorate over the whole of Baluchistan has been established, and the town of Quetta (which is now reached by railway from India) and a part of the country have been absolutely annexed. The khan receives an annual subsidy from India. The population is estimated at about 800,000.

Balucki, ba-loots'ke, **Michael**, Polish author, known under the pseudonym ELIPIDON: b. Cracow, 29 Sept. 1837. He is most popular as a story-teller of satirical tendency, ridiculing the shortcomings and prejudices of Polish society. Of his novels may be mentioned 'The Awakened' (1864); 'The Old and the Young'

BALUSTER—BALZAC

(1866); 'Life Among Ruins' (1870); 'The Jewess' (1871); 'For Sins Not Committed' (1879); '250,000' (1883). The best among his comedies are: 'The Chase After a Man' (1869); 'The Emancipated' (1873); 'Amateur Theatre' (1879); 'The Open House' (1883). He also wrote lyric poetry and essays on Polish literature.

Bal'uster, or Ballister, a kind of short column, sometimes in the form of an ancient bow, sometimes made after the model of Greek and Roman columns, employed in the construction of balustrades.

Balustrade, a series of balusters surmounted by a rail, and placed as an ornament on large buildings, above the cornice, or as a protection to enclose bridges, stairs, balconies, altars, and the like.

Baluze, bā-lüz, Etienne, French scholar and historian: b. Tulle, 24 Dec. 1630; d. Paris, 28 July 1718. He early acquired distinction by his varied and thorough knowledge, and was called to Paris by the celebrated Colbert, who commissioned him to make up his private library. In 1707 he was appointed to the superintendence of the royal college, and dismissed from that office in 1709, being suspected of having, in his 'Histoire Généalogique de la Maison d' Auvergne,' designedly established, by documentary evidence, that the princes of Bouillon were descended from the ancient dukes of Guienne, counts of Auvergne, and therefore owed no allegiance to the king of France. Such an offense could not be forgiven; and Baluze, deprived of nearly all his income, was compelled to reside successively at Rouen, Blois, Tours, and Orléans, and not until after the conclusion of the Peace of Utrecht was he permitted to return to Paris. He was of the most amiable temper, and his wit was equal to his cheerfulness.

Balzac, bāl-zāk, Honoré de, French novelist: b. Tours 20 May 1799; d. 18 Aug. 1850. His father had, under the old régime, been secretary to the grand council in the reign of Louis XV. Young Balzac was educated at the College of Vendôme, and afterward at a school kept by a M. Lepitre. He was subsequently placed in a notary's office; but the bent of his genius soon showed itself, and he began to contribute articles to the journals and to write romances. Before completing his 24th year he had published, under various *noms de plume*, 'The Two Hectors,' 'The Centenarian,' 'The Vicar of Ardennes,' 'Charles Pointel,' 'The Tartar, or the Return of the Exile,' and 'Clotilde of Lusignan.' Various other books followed, but the success attending all was very indifferent, and it was not till 1829, by the publication of 'The Last of the Chouans,' a tale of La Vendée, and the first novel to which Balzac appended his name, that the attention of the public was directed to the extraordinary genius of the author. A still greater popularity attended his 'Physiology of Marriage,' a work full of piquant and caustic observations on human nature. A titanic work was then projected by him, which, under the title of 'The Human Comedy,' should embrace a series of compositions corresponding to its title and portrayed the different peculiarities and follies of human nature. The execution of this scheme was zeal-

ously and elaborately proceeded with, and extending over 20 years, was only brought to a close by death.

In attempting to carry out this impossible design, he produced what is almost in itself a literature. The stories composing the 'Human Comedy' are classified as 'Scenes of Private Life,' 'of Parisian Life,' 'of Political Life,' 'of Military Life,' etc. They are connected by a web of intrigue which has the Paris of the Restoration for its centre, but which stretches its threads over the provinces. Each of the actors in the brilliant crowded drama is minutely described and clothed with individuality, while the scenes in which they move are set forth with a picturesqueness and verisimilitude hardly to be matched in fiction. Among the masterpieces which form part of Balzac's vast scheme may be mentioned 'Lost Illusions'; 'The Peasants'; 'The Woman of Thirty'; 'Poor Relations'; 'The Quest of the Absolute,' and 'Eugénie Grandet.' The 'Droll Stories' (1833) stand by themselves. They are a series of gross stories in the vein of Rabelais, Balzac reproducing with masterly skill the French of the 16th century.

Balzac's industry was phenomenal. He represents himself as working regularly for 15 and even 18 hours a day. He wrote 85 novels in 20 years, and he was not a ready writer, being very fastidious in regard to style, and often expending more labor on his proof-sheets than he had given to his manuscript. His work did not bring him wealth; his yearly income, even when he was at the height of his fame, is said to have rarely exceeded 12,000 francs. During his later years he lived principally in his villa, Les Jardies, at Sèvres. In 1849, when his health had broken down, he traveled to Poland to visit Madame Hanska, a rich Polish lady with whom he had corresponded for more than 15 years. In 1850 she became his wife, and three months after the marriage Balzac died in Paris.

His influence on literature has been deep and many-sided, and novelists with so little in common as Feuillet and Zola alike claim him for their master. He studied character and the machinery of society in a scientific spirit, but he was not content with the photographic reproduction of fact. He was a visionary as well as an analyst, an idealist and a realist in one. The materials acquired by study were shaped and colored by his fiery and teeming imagination. In the 'Human Comedy' we see the everyday world reflected in a magic mirror where the lights are brighter, the shadows darker; where objects stand out in sharper relief and are sometimes oddly distorted. He strenuously exaggerates in the delineation of character. "Every one in Balzac," says Baudelaire, "down to the very scullions, has genius." His work bears trace of the strain with which it was produced; it is often coarse, often extravagant, occasionally dull. But few writers give such an impression of intellectual force, and in the power of investing his creations with apparent reality he stands first among novelists.

The definitive edition of his works was published in 25 volumes (1869-75); the last contains his correspondence 1819-50 (English translation, with memoir, 2 vols. 1879). A complete translation was made by Miss K. P. Wormley (1889-94) and another edition (1899) has been published in Philadelphia.



HONORÉ DE BALZAC.

BALZAC—BAMBOO

Bibliography.—Lovenjoul, 'Histoire des œuvres de H. de Balzac'; Saltus, 'Balzac'; Wells, 'Century of French Fiction.'

Balzac, Jean Louis Guez de, French essayist and letter writer: b. Angoulême, 1797; d. 18 Feb. 1854. Under Richelieu he became royal counselor, and historiographer of France, and was one of the most influential members of the Academy from its foundation, likewise a sort of oracle of the Hôtel Rambouillet. His influence on French prose is ranked with that of Malherbe on poetry. Besides his 'Letters' (1624), which are elaborate epistles with a definite attempt at style, he wrote 'The Prince' (1631), a glorification of absolute monarchy; 'The Dotard' (1648); 'The Christian Socrates' (1652); and 'Aristippus' (1658), the latter intended to portray the ideal statesman.

Balzico, bāl-tsē'kō, Alfonso, Italian sculptor: b. 1825. He was educated at the Academy of Naples, and in Rome. Among his works are: 'John the Baptist'; 'Cleopatra'; 'The Free'; 'Vincenzo Bellini'; 'Duke Ferdinand of Genoa'; and 'Victor Emmanuel.'

Bambarra, bam-bar'ra, a negro kingdom of western Africa, lying at the point where 5° W. lon. and 12° N. lat. cross. It was first visited by Mungo Park. In the east the country is flat and swampy; but in the west there are low chains of granite hills. The climate in some parts is intensely hot, but is generally healthy. The land is well watered and fertile. The rainy season is from June to November. Cotton, maize, and yams are raised. The inhabitants, a branch of the Mandingoes, number about 2,000,000 and are superior to their neighbors in intelligence. The principal towns are Sego, Sansandin, Yamina, and Bammako. Many local merchants are very wealthy, and a quite extensive trade is carried on, the natives working articles in gold, ivory, and iron. In 1881 a treaty with the sultan of Sego opened up the country to French traders.

Bamberg, bām'bērg, a town of Bavaria, in Upper Franconia, on the navigable Regnitz (which here divides into two), three miles above its junction with the Main, partly on a plain, partly on hills, amid vineyards and gardens. Its chief edifice is the Roman Catholic Cathedral, built in the 12th century, and forming one of the finest examples of the transition from the Romanesque to the Gothic style, with four towers, a noteworthy portal, and interesting sculptures and monuments. Other buildings include the old palace or residence; another palace, formerly occupied by King Otto of Greece; the former castle of the prince-bishops of Bamberg, etc. The educational institutions include a college or lyceum, an old and a new gymnasium, a Roman Catholic seminary, an observatory, etc. There is a library containing 300,000 volumes, with valuable MMS. and early printed books. There are manufactures of cotton and woollens, besides other industries, such as market-gardening and seed-growing, brewing, etc. The United States is represented by a resident consul. Pop. (1902) 42,300.

Bamberger, bām'bērg-ēr, Heinrich von, Austrian pathologist: b. Prague, 1822; d. 1888. He was graduated in medicine in 1847, and became professor of special pathology and therapeutics, first in the University of Würzburg, and in 1872 in the University of Vienna. Of

his numerous publications, two have been held in particularly high esteem, 'On the Diseases of the Chylopoietic System' (1855), and 'Treatise on Diseases of the Heart' (1857).

Bamberger, Ludwig, German statesman: b. Mainz, 1823; d. 1899. He was educated at Giessen, Heidelberg, and Göttingen; took part in the revolution of 1849; and was a member of the German Reichstag 1873-80. He was an advocate of free trade, and on account of his opposition to Bismarck's economic policy, he left the National Liberal party and joined the "Secessionists," a group which later became part of the German Liberal party. His publications include 'Monsieur de Bismarck' (of which there is an English translation); 'The Five Millions'; 'Germany and Socialism'; etc.

Bambino, bām-bē'nō, the figure of our Saviour represented as an infant in swaddling clothes. The 'Santissimo Bambino' in the Church of Ara Cœli at Rome, a richly decorated figure carved in wood, is specially venerated, and is often the object of impressive religious demonstrations.

Bambocciades, bām-bōch-ī-ādz', paintings generally grotesque, of common, rustic, or low life. The name is derived from the nickname of Peter Van Laer, a Dutch painter of the 17th century, who, on account of his deformity, was called *bamboccio* (cripple). Teniers is the great master of this style.

Bamboo, the common name of more than 200 species of about 20 genera of perennial, mostly tree-like, tropical and sub-tropical grasses unevenly distributed throughout the world, but most abundant in southern Asia, where 160 or more species are found from sea-level to altitudes of 10,000 feet or slightly more in the Himalayas; and next most plentiful in America, where there are about 70 species, some of which reach elevations of 15,000 feet in the Andes. Occasional specimens of the larger species attain a height of 120 feet and a girth of 3 feet. From the jointed root-stock the numerous jointed, usually straight and erect, but sometimes crooked or creeping stems grow without branches until the full height is reached, when a more or less dense thicket of horizontal limbs is developed, and the great panicles of flowers appear.

The number of uses to which these plants are put rivals that of the palms. In fact the various species can be utilized for man's every purpose. The light, elastic hard stems, hollow or slightly pithy, except at the joints, which are strong partitions, are used for bridges, masts, poles, joists, fishing-rods, etc.; when the partitions are removed, for waterpipes; when sawed in sections, for pails (the natural partitions serving as bottoms), cooking-utensils, life-preservers, bows, arrows, quivers, walking-canes, flutes, and smoking-pipes; when split, for nets, hats, fishing-rods, wicker-work, and umbrellas. Parts of the leaves of some species are used for paper-making, thatch, and hats; the young shoots of some are used as food, either boiled or pickled; the seeds, for food and for making a kind of beer; some of the spiny species are planted as hedges for defense against foes, animal and human.

Some species yield "Indian honey" (so called by the Greeks), the air-dried saccharine exudations from the nodes. Sometimes this sub-

BAMBOO RAT—BANANA

stance is called *tabaris* or *tabasheer* (q.v.), which is properly a phosphorescent substance obtained from other species and from related grasses. Many of the species are of exceedingly rapid growth; even in greenhouses specimens have been known to attain a height of 20 feet in two months or even less time. In arid climates the bamboos are often of great value, since they are among the few plants that will grow in such places. Many species are cultivated for ornament, not only in warm countries, but in greenhouses. Some species are hardy in climates where the thermometer does not fall much below the freezing-point. In general the hardy species do best in deep, rich soil, and warm situations protected from severe winter winds. The roots should be given a protective mulch of litter in autumn, and this should be allowed to remain during the summer as a moisture conserver. For an account of ornamental bamboo culture in greenhouse and out of doors, and of the ornamental species grown in America, consult Bailey & Miller, 'Cyclopedia of American Horticulture.'

Bamboo Rat, a name given to several species of mole-rats, of the genus *Rhizomys*, found in the bamboo jungles of India.

Bamborough (bām'būr-ō) **Castle**, an ancient English castle on the coast of Northumberland, formerly with its connected estate the property of the Forsters, and forfeited to the Crown in 1715, both being purchased by Lord Crewe, Bishop of Durham, and bequeathed by him for charitable purposes.

Bam'bouk, or **Bambuk**, a region in west Africa, in the French colony of Senegal, between the Falémé and Senegal rivers, between lat. 12° 30' and 14° 30' N; lon. 10° 30' to 12° 15' W., and estimated to be about 140 miles in length by 80 to 100 in breadth. Besides the Senegal, its tributaries, the Falémé and the Bafing (or Upper Senegal), form its natural boundaries. A considerable part is somewhat rugged, though not very elevated, the highest points seldom exceeding 600 feet. The valleys and plains are remarkably fertile. The baobab, calabash, tamarind, with a variety of acacias and palms, reach the utmost limit of their fruitfulness; maize, millet, cotton, and a multitude of leguminous plants grow almost without culture, and rice is produced in the lowlands, which are subject to inundation. Its unhealthiness, however, makes it almost uninhabitable by Europeans. The animals comprise lions and elephants, wild cattle, crocodiles, etc. Gold is found in abundance. It is carelessly worked, and is given to traders in exchange for salt, an article in great demand, and various other goods. Bam'bouk is more sparsely inhabited than formerly. The natives are Mandingoes and form a considerable number of communities or confederations more or less hostile to each other. The country has latterly been fully explored by the French, who are developing its resources and have constructed a railway along the Senegal from Kayes to Bafulabé. In the 15th century the Portuguese, allured by the fame of its gold, invaded Bam'bouk, but ultimately perished almost to a man, partly through intestine dissensions and debauchery, and partly by the weapons of the natives.

Bamian, bā-me-ān', a valley and pass of Afghanistan, the latter at an elevation of 8,496

feet, the only known pass over the Hindu Kush for artillery and heavy transport. The valley is one of the chief centres of Buddhist worship and contains two remarkable colossal statues and other ancient monuments.

Bammako, bā-mā'kō. See **BAMBARRA**.

Bampton Lectures, a course of lectures established by John Bampton, canon of Salisbury, who bequeathed certain property to the University of Oxford for the endowment of eight annual divinity lectures to be annually delivered. The subjects prescribed are, the Confirmation of the Christian faith and the confutation of all heretics and schismatics; The divine authority of the Scriptures; The authority of the primitive Fathers in matters of Christian faith and practice; The divinity of Christ; The divinity of the Holy Ghost; The Apostles' and Nicene creeds. The lecturer must have taken the degree of M.A. at Oxford or Cambridge, and the same person may not lecture twice. The first course of lectures was delivered in 1780, and they have been delivered every year since, with the exceptions of 1834, 1835, and 1841. A list of the lectures will be found in the yearly 'Historical Register of the University of Oxford.'

Ban, the title of the governors of certain military districts in the eastern part of Hungary, corresponding to the German title of margrave. The ban is nominated by the king, renders an oath to the Diet, and formerly had very extensive powers, exercising an almost absolute authority in the political, judicial, and military affairs of his district. The progress of Turkish conquest after the unfortunate battle of Mohacs in the 16th century extinguished the most of the banats, and there remains now only the banat of Temesvar, the ban of which is the third great dignitary of the Hungarian kingdom and has the title of ban of Croatia.

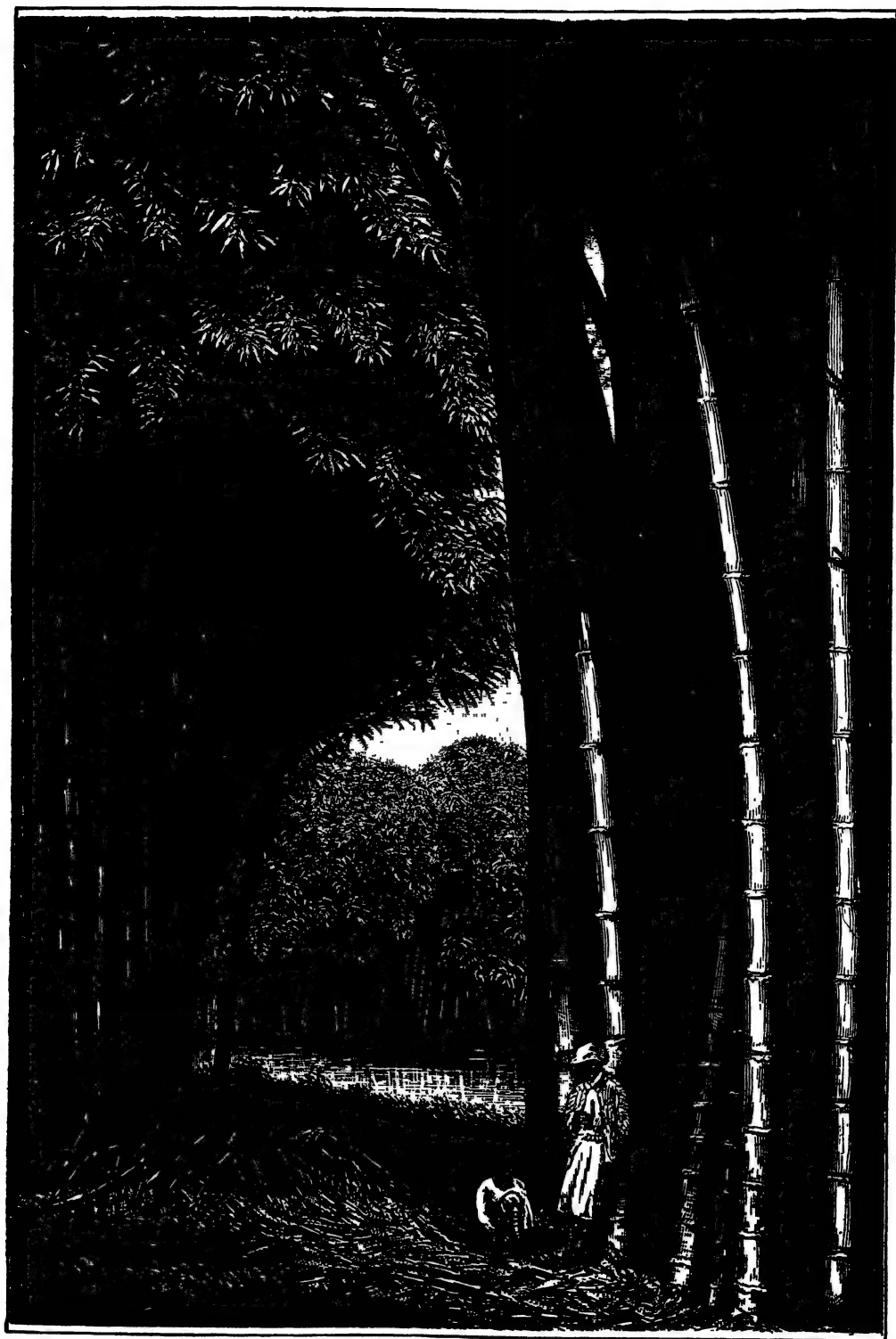
In Teutonic history the ban was an edict of interdiction or proscription; thus, to put a prince under the ban of the empire was to divest him of his dignities and to interdict all intercourse and all offices of humanity with the offender. Sometimes whole cities have been put under the ban; that is, deprived of their rights and privileges.

Bana, bā'na, in Hindu mythology, a thousand-armed demon or giant who was the enemy of Vishnu, but the friend of Siva.

Ban'ak, or **Ban'nock**, an Indian tribe of Idaho. Its territory formerly extended over southern Idaho and eastern Oregon; but the tribe is now concentrated on the Fort Hall and Lemhi reservations, Idaho. Those of the latter reservation are confederated with the Shoshoni.

Banana, ba-na'na, an island in west Africa, north of the mouth of the Kongo; also a seaport of the Kongo Free State, situated on the island. A few years ago the town was an important commercial station, but after the building of the railroad from Matadi, and the establishment of an ocean steamship line direct to that place, Banana began to decline, and, at last lost all its trading importance when the extensive Dutch firms formerly established there removed their headquarters to Kabinda and Kisanga, in Portuguese territory.

Banana (*Musa sapientum*), a tropical herb of the natural order *Scitamineæ*, apparently native of India, but unknown in a wild state;



BAMBOO GROVE IN JAVA.

BANANA-BIRDS — BANCROFT

valued somewhat for its fibre and decorative appearance, but mostly on account of its fruit, for which it is widely cultivated in warm climates. For a large part of the human race it ranks as high as cereal grains among northern peoples. Though considered less nutritious than an equal weight of potatoes, the banana is said to produce more food upon a given area and to be capable of sustaining a larger number of persons than wheat. From its perennial rootstocks suckers are thrown up to a height of from 8 to 40 feet or more. They bear a whorl of paddle-like leaves, from among the bases of which, in about two years, a large heart-shaped scaly bud appears. As the bud grows it becomes pendant, the scales separate and disclose groups of upward-pointing flowers sometimes to the number of 150. The fruit is gathered while still green, the stem being cut at the same time. Of the suckers that quickly appear, one, two, or three are allowed to remain for the succeeding crop. When once established the plants should bear a bunch every year. Since the plants rarely or never bear seeds, suckers are usually relied upon for propagation. Propagation by means of root-cuttings is a more rapid means of multiplying the number of plants, but is used only when large numbers are desired. The plants are set in the field 8 to 12 feet apart when two or three feet high; when full grown they completely shade the ground. Since 1870, when only a few hundred bunches were imported into the United States, the banana has become increasingly popular: in 1899 \$5,600,000 worth was imported, mainly from the West Indies and Central America. California, Florida, and Louisiana produce a small quantity, but these States cannot be expected to compete with warmer climates. Banana flour, produced in the tropics from ripe bananas, is growing in popularity wherever introduced, and dried bananas seem to promise an outlet for excessively heavy crops. The botanical name, *Musa sapientum*, which means "of the wise muse," alludes to Theophrastus' statement that the wise men of India used a certain fruit for food, which seems to have been the banana or the plantain.

Banana-birds, any of several small West Indian insect, and honey-eating birds that frequent the banana groves, especially the bananaquit (*Certhiola flaveola*) of Jamaica, whose pretty ways are described at length by Gosse in his books on the natural history of that island. One species (*C. bahamensis*) occasionally visits Florida. All these birds are brilliantly plumaged, usually rich blue with yellow markings, and represent the sun-birds (q.v.) of the Eastern tropics.

Banana-fish. See LADY-FISH.

Bananal, bá-na-näl', also called SANTA ANNA, an island in Brazil, formed by the River Araguaya, in the province of Goyaz. Its length is 200 miles; breadth 35 miles. It is covered with dense forests, and has in its middle an extensive lake. Soil, fertile. Also the name of several small villages in Brazil.

Banas, ba-näs', a common name for rivers in India. The most important are: (1) a river of Shutia Nagpur, Bengal, having a north-west course of about 70 miles, and falling into the Sone, near Rampur; (2) a river which rises in the Aravulli Mountains, and, after a southwest course of 180 miles, is lost in the

Runn of Cutch; (3) a river of Rajputana, also rising in the Aravulli Mountains, flowing north-east through Mewar for 120 miles, then south-east, and falling into the Chambal, after a total course of 300 miles.

Ban'at, a term applied to any district ruled by a ban (q.v.). Specifically a large and fertile region in Hungary, consisting of the counties of Temesvar, Torontal, and Krisso; principal town, Temesvar. The region originally belonged to Hungary; was occupied by the Turks in 1652-1716; and was reunited to Hungary in 1779. The population exceeds 1,500,000.

Ban'bridge, Ireland, a market town in County Down, 22 miles southwest of Belfast, situated on the Bann. It has an Episcopal church in the Gothic style, and several other churches. The principal manufacture is that of linen, which is carried on to a great extent. Pop. (1901) 5,376.

Ban'bury, England, a municipal borough and market town of Oxfordshire, on the Oxford Canal, 23 miles north of Oxford, and 78 northwest of London by rail. Its strong castle, built about 1125, was demolished during the Great Rebellion, when Banbury was noted for Puritanical zeal. In 1469 the Yorkists were defeated in the vicinity. The town is still famous for its cakes and ale, as in Ben Jonson's day; and it manufactures webbing and agricultural implements. Among the buildings are the parish church (1797) and the town hall (1854). Pop. (1901) 12,967.

Banc (Lat. *Bancus*, Ger. Bank, a bench), legally a seat or bench of justice, and in this sense has given rise to the expression in courts of common law, "sitting in banc," or *in banco* — that is, sitting together on the bench of the respective courts.

Banca, ban'ka, **Banka**, or **Bangka**, an island of the Malay Archipelago, belonging to the Netherlands, between Sumatra and Borneo; area, 5,000 square miles. It possesses several considerable bays and is hilly. It is celebrated for its excellent tin, obtained in black alluvium in the north end of the island, about 25 feet below the surface, and of which the annual yield is about 4,000 tons. Banca likewise yields iron, copper, lead, timber, sago, nutmegs, benzoin, etc. The population is about 100,000, of which a large proportion are Chinese.

Banca, a boat used in the Philippines, made from a single log and furnished with an out-rigger.

Ban'co, a term designating the money in which the banks of some countries keep or kept their accounts in contradistinction to the current money of the place, which might vary in value or consist of light and foreign coins. The term was applied to the Hamburg bank accounts before the adoption (in 1873) of the new German coinage. The mark banco had a value of 35-43 cents; but there was no corresponding coin.

Bancroft, Aaron, Unitarian clergyman: b. Reading, Mass., 10 Nov. 1755; d. 19 Aug. 1839. He was graduated at Harvard in 1778; became pastor in Worcester in 1785, where he remained nearly 50 years. Besides a great number of sermons, his works include a 'Life of George Washington' (1807). He was the father of the historian, George Bancroft.

BANCROFT

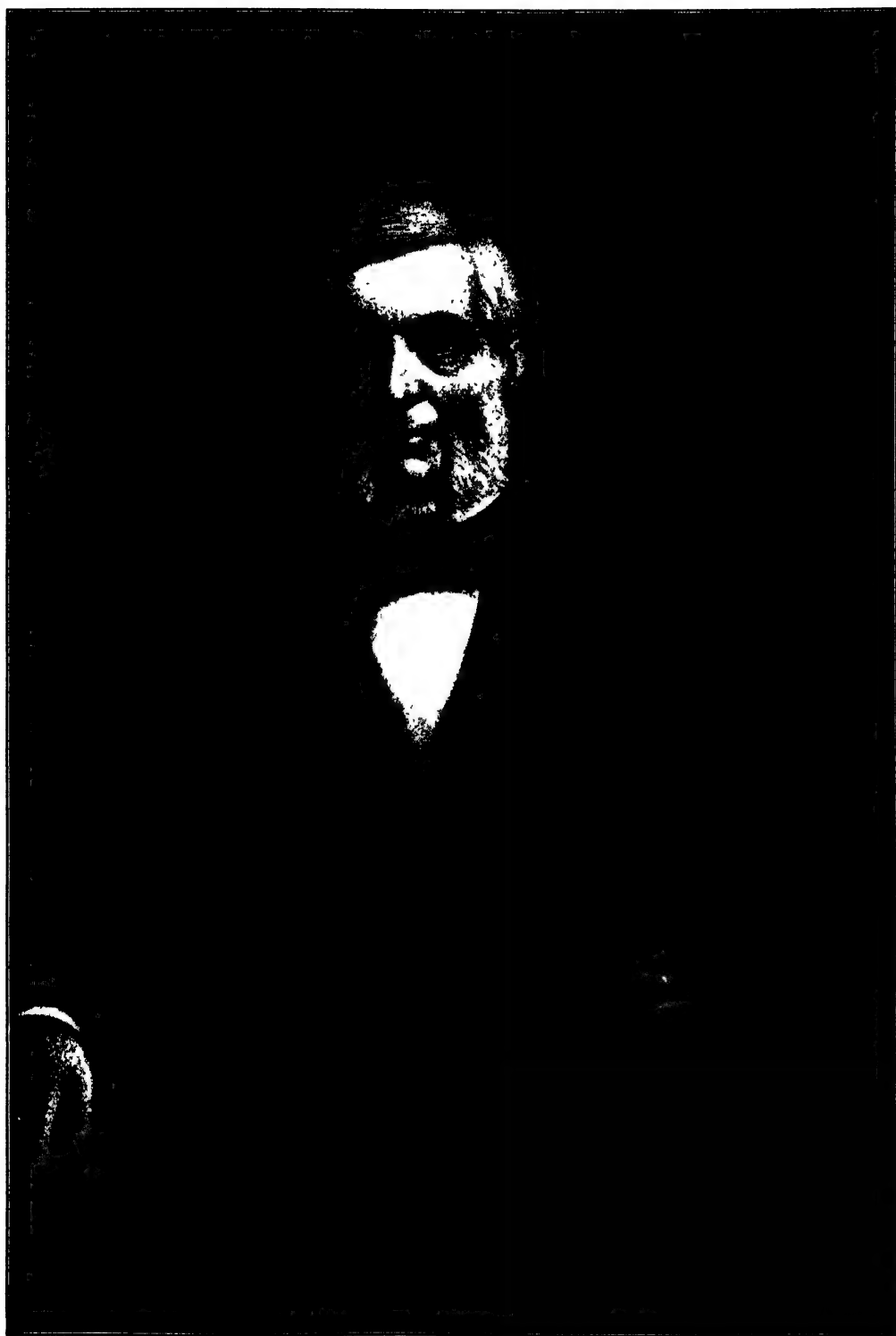
Bancroft, Cecil Franklin Patch, educator: b. New Ipswich, N. H., 25 Nov. 1839. He graduated from Dartmouth in 1860; at Andover Theological Seminary in 1867; and at the University of Halle, Germany. He was ordained to the Congregational ministry in 1867, but has never held a pastorate. In 1873 he was made principal of Phillips Academy, Andover, Mass., and since then has sent more boys to colleges and scientific schools than any other American secondary school teacher. He has frequently contributed religious and educational articles to periodicals.

Bancroft, Edward, American physician: b. Westfield, Mass., 9 Jan. 1744; d. 8 Sept. 1820. Early in life he ran away from home; became a practising physician in Guiana; and passed the latter part of his life in England. During the Revolutionary war he is believed to have been a spy for the British. His publications include a 'Natural History of Guiana' (1769) and 'Researches Concerning the Philosophy of Permanent Colors' (2 vols. 1794-1813).

Bancroft, George, American historian: b. Worcester, Mass., 3 Oct. 1800; d. Washington, D. C., 17 Jan. 1891. He was the son of Rev. Aaron Bancroft (q.v.), a Unitarian clergyman, and Lucretia Chandler Bancroft. He fitted for college at Phillips Academy, Exeter, N. H., entered Harvard College at the age of 13, and was graduated before reaching his 17th birthday. Edward Everett, then professor of Greek, having proposed that some young graduate of promise be sent to Germany for purposes of study in order that he might afterward become one of the corps of instructors, Bancroft was chosen, and in the summer of 1818 went to Göttingen, where two years later he received his degree of Ph.D. At Göttingen he studied German literature under Benecke; Italian and French literature under Artaud and Bunsen; Oriental languages and New Testament Greek under Eichhorn; natural history under Blumenbach; and the antiquities and literature of Greece and Rome under Dissen, an enthusiastic admirer of Plato, with whom he went through a thorough course of Greek philosophy. But his chief attention was given to history, which he studied under Heeren, the greatest historical critic of that day, and one of the most scientific of all historians. In choosing this special branch, Bancroft gave as a reason his desire to see if facts would not clear up theories and assist in getting out the true one. For a time he also studied at Berlin, where he was warmly received by the leaders in the academic world, notably, Wolf, the editor of Homer; Schleiermacher, and Hegel, to whom he brought tidings of their fame in the New World. In an extended tour through Germany and other countries he met Goethe at Jena, studied for a time with Schlosser at Heidelberg, formed an acquaintance with Manzoni at Milan and a life friendship with Chevalier Bunsen at Rome, where he also met Niebuhr. At Paris he was kindly received by Cousin, Benjamin Constant, and Alexander von Humboldt. Returning to America in 1822 he served for a year as tutor in Greek at Harvard. In 1823, in conjunction with J. G. Cogswell, he established the famous Round Hill School at Northampton, Mass., a preparatory school far in advance of its time as to systems of study and class-books. The teachers were

good, the instruction inspiring, and the students led a happy, healthy life, but the undertaking proved a failure financially. Bancroft withdrew in 1830, and Cogswell two years later. Many of their students afterward became men of national reputation or prominence, among them being J. L. Motley, Ellery Channing, G. E. Ellis, and Theodore Sedgwick. Henceforward his career is best separated into political and literary. During the Round Hill years he had cut loose from the political traditions of the Harvard circle. In a public speech in 1826 he had avowed his principles to be for universal suffrage and uncompromising democracy, and at once became foremost in the councils of the Democratic party, though twice declining nomination or election to the State legislature. Van Buren appointed him collector of the port of Boston (1838-41), and his administration of the office won the praise of his political opponents. While collector he appointed Nathaniel Hawthorne and Orestes Brownson to offices within his jurisdiction. In 1844 he was defeated as the Democratic candidate for governor of Massachusetts, although he received more votes than any previous candidate of his party. In 1845 he became secretary of the navy under Polk. It was he who planned and established the Naval Academy at Annapolis, Md.; he gave the first order to take possession of California; and while acting secretary of war ordered Gen. Taylor to march into Texas, thus ultimately leading to the annexation of that State. During 1846-9 he was minister-plenipotentiary to Great Britain, and there successfully urged upon the British ministry the necessity of adopting more liberal navigation laws. His reputation as a man of letters put the manuscript treasures of the great English families at his disposal, and he combined his public duties with ardent historical researches. From 1849 to 1867 he lived in New York city, absorbed in literary work. During the Civil War he was a patriotic War Democrat, and delivered a powerful speech effectually demolishing the Constitutional plea for slavery. Before both Houses of Congress he delivered a masterly eulogy on Lincoln. Appointed minister to Prussia in 1867 he achieved a diplomatic triumph in bringing about the adoption of treaties in which England and Germany finally recognized the right of expatriation and abandoned their doctrine of "once a citizen, always a citizen." In the northwest boundary treaty, negotiated by Polk, there was an ambiguity concerning a portion of the line. It was decided to submit the point to the German emperor for arbitration. Bancroft prepared the whole American argument and the reply to the case of the British. The decision was unreservedly in favor of the United States.

His first publication was a volume of 'Poems' (1823), all European in theme. This was followed by books for the use of his students, translations of Heeren's 'Politics of Ancient Greece' (1824), and Jacobs' 'Latin Reader' (1825). His first article in the 'North American Review' appeared in October 1823, and was a notice of Schiller's 'Minor Poems' with numerous translations. Thenceforward he wrote in almost every volume, but always on classical or German themes, until in January 1831, he took up 'The Bank of the United States', and in October 1835 'The Documentary History of the American Revolution.' The two



GEORGE BANCROFT.

BANCROFT

latter indicate the direction his historical studies had taken. Then came the beginnings of his great 'History of the United States,' the work which gave him his greatest fame. The first volume appeared in 1834, the second in 1837, the third in 1840, the fourth in 1852, the fifth in 1853 and so onward to the tenth in 1874. The earlier volumes were received with enthusiasm in America, pirated in England, translated into Danish, Italian, German, and French, both with and without the author's permission. The 15th editions of Vols. I-III was issued in 1853. The design of the work was as deliberate as Gibbon's, and almost as vast, and, like Gibbon, Bancroft lived to see his work accomplished. The history of the United States from 1492 to 1789 is treated in three parts. The first deals with 'Colonial History, 1492-1748.' The second part, 'The American Revolution, 1748-82,' is divided into four epochs called respectively: 'Overthrow of the European Colonial System, 1748-63'; 'How Great Britain Estranged America, 1763-74'; 'America Declares Itself Independent, 1774-5'; and 'The Independence of America Acknowledged, 1776-82.' The last part, though published as a separate work, entitled 'History of the Formation of the Constitution, 1782-9,' is really a continuation of the 'History.' The work is still the most popular and widely read of the larger American histories. Bancroft's materials and facilities for writing it were better and more extensive than any other writer on our Anglo-American history has enjoyed. His private collection of manuscripts and documents, original and copies (now in the Lenox Library, New York), was by far the finest of his day in private hands, and superior to most institutional collections. His merits as a historian are positive and incontestable. For his subject he had a boundless and untiring enthusiasm, and he was permeated with that democratic spirit without which the history of the United States cannot be adequately written. Though his early style is justly open to the charge of being pompous, inflated, and over-ornamented, it is essentially picturesque, and the earlier defects were greatly remedied by his successive revisions of the work. His command of his resources was masterly, and a far from favorable critic candidly admits that "one must follow him minutely through the history of the war for independence to appreciate in full the consummate grasp of a mind which can deploy military events in a narrative as a general deploys brigades in a field. Add to this the capacity for occasional maxims in the highest degree profound and lucid, and you certainly combine in one man some of the greatest qualities of the historian." It has been said that he made no effort to avail himself of the materials and results of other investigators, but nowhere does he claim finality for his work, and his later years were chiefly occupied in weaving into his narrative what he and no one else had. In 1876 he issued a Centenary edition in six volumes, upon which he had spent a solid year in revision. Again in 1883-5 he published what he termed the "author's last revision" in six volumes large octavo. In this he made considerable changes in arrangement and the subdivisions, all tending to a better ordering of the narrative. There were frequent omissions and condensations, and many repetitions and redundancies were cast out. These final changes

have, in the judgment of good scholars, better fitted the work for permanent favor. It will remain necessary to the student until another historian, with equal or better facilities, shall rewrite the story in a way to gain wider sympathy. Present tendencies and methods in historical study and writing give little evidence that such another will soon arise. His lesser works include 'Poems' (1823); 'Literary and Historical Miscellanies' (1855); 'Memorial Address on the Life of Lincoln' (1866); 'Joseph Reed: a Historical Essay' (1867); 'A Plea for the Constitution of the United States Wounded in the House of Its Guardians' (1886); 'Necessity, Reality, and Promise of the Progress of the Human Race' (1854); 'Oration, 4 July 1826, Northampton, Mass.'; 'Oration Before the Democracy of Springfield, Mass., 4 July 1836'; 'Address at Hartford, Conn., 18 Feb. 1840'; 'History of the Formation of the Constitution of the United States' (1882); 'Oration Delivered at the Commemoration, in Washington, of the Death of Andrew Jackson, 27 June 1845.' To the American Encyclopædia he contributed the article on Jonathan Edwards. See Green, 'George Bancroft' (1891); Wallis, 'Mr. Bancroft as a Historian' (1896); West, 'George Bancroft' (1900).

Bancroft, Hubert Howe, American historian: b. Granville, Ohio, 5 May 1832. In 1852 he went to California to establish a book business, and began to collect documents, maps, books and MSS. for a complete 'History of the Pacific States' from Mexico to Alaska. In 1893 this library numbered 60,000 volumes, to which many additions have been made. His histories are still in preparation. 'Literary Industries' (Vol. XL, San Francisco, 1890) describes his work.

Bancroft, Marie Effie Wilton, English actress, wife of Sir Squire Bancroft (q.v.). She appeared on the stage when a child, and acted in several places before making her London debut. In London she won great popularity in several plays, particularly in 'The Maid and the Magpie' at the Strand. In 1865 she became a partner in the management of the Prince of Wales' Theatre, and obtained Squire Bancroft (afterward her husband) as leading man. Since then she has been associated with him as manager and actress.

Bancroft, Richard, English archbishop: b. Farnworth, Lancashire, 1544; d. 1610. He studied at Cambridge, entered the Church, and rose rapidly during the reign of Elizabeth till he obtained the see of London in 1597. After her death James I. made him archbishop of Canterbury on the death of Whitgift. He possessed good talents, and was distinguished as a controversialist, a preacher, and a politician. The greatest blot on his memory is the rigor with which he treated the Puritans.

Bancroft, Sir Squire, English actor: b. 1841. He began his career in Birmingham in 1861, and played at Dublin and Liverpool. In 1865 he made his first appearance at the Prince of Wales' Theatre, and continued there several years as leading man in a series of comedies depicting modern life, among which are: 'Society'; 'Caste'; 'Play'; 'School'; and 'M. P.' In 1880 he moved with his wife to the Haymarket Theatre, where he continued presenting the same line of plays. Since 1885 he has ap-

BANCROFT—BAND SAW BLADES

peared but little, though he took part in 'Diplomacy' at the Garrick Theatre in 1893.

Bancroft, Wilder Dwight, American chemist: b. 1867. He was educated at Harvard and abroad, and obtained the degree of Ph.D. at Leipsic. He was instructor of chemistry at Harvard 1894-5; was appointed assistant professor of chemistry at Cornell in 1895. In the same year he founded the 'Journal of Physical Chemistry' and became its editor.

Bancroft, William Amos, American railway president: b. Groton, Mass., 26 April 1865. He was graduated from Harvard University 1878, Harvard Law School 1881, and was admitted to the Suffolk bar 1881. He was elected mayor of Cambridge in 1893 and has occupied many positions of political importance. He is also director in many educational and financial institutions.

Band, in music, a number of trained musicians in a regiment, intended to march in front of the soldiers and play instruments, so as to enable them to keep step as they move forward; also any similarly organized company of musicians, though unconnected with the army; an orchestra. The word is also applied to the subdivisions of an orchestra, as string-band, wind-band, etc.

In architecture, any flat fascia or ornament which is continued horizontally along a wall, or by which a building is encircled. Bands often consist of foliage, quatrefoils, or of simple bricks. Band of a shaft is the molding or suits of moldings by which the pillars and shafts are encircled in Gothic architecture. Several bands are often placed at equal distances on the body of the shaft, when it is long, in which case they are known as shaft-rings.

As vestment, bands are linen pendants from the neck, forming part of clerical, legal, and academic costume. It is a moot question whether they are a survival of the amice, or immediate descendants of the wide falling collar which was a part of the ordinary civilian dress in the reign of James I. In the Anglican Church they are seldom worn, except by ultra-low Churchmen; but they are in common use with Presbyterian ministers (ordained ministers as distinguished from licentiates). Foreign Catholic ecclesiastics wear black bands with a narrow white border.

Band-fish, a genus in the family *Cepolidae*, having the body much elongated and compressed, and is covered by very small scales. The dorsal fin is very long, and consists like the anal of soft rays. The tail vertebræ are very numerous, and the whole structure of the body exhibits unusual delicacy, so that specimens are seldom obtained in an uninjured state. All the species inhabit quiet depths, and are unable to contend with waves and currents. The snake-like form and the beauty of their colors make them objects of great interest. One species, the red band-fish (*C. rubescens*), not uncommon in the Mediterranean, is occasionally cast ashore by storms on the British coasts. It is about 15 inches long. Its brilliant appearance, when seen moving in the water, has suggested the names of fire-flame and red ribbon, by which it is known at Nice. The home of the genus is in Japanese waters. See OAR-FISH.

Band of Hope Union, an association of the children's temperance societies of Great Britain, having upward of 15,000 allied associations, with a membership of 2,000,000.

Band Saw Blades. Owing to the increased value of timber in America more and more attention has been paid to the economical conversion thereof into the sawn product ready for market. The methods in use a few years ago were found to be wasteful and usually crude, and the product turned out of but an indifferent quality so far as sawing was concerned.

The attention of the operator being directed to band saw blades, these have come into quite general use for various purposes. A test of the band saw blade has proven its advantages to be so great that it has displaced not only the small scroll or "jig" saws for bracket sawing and ornamental scroll and curved work, but has also displaced reciprocating saws and circular saws for heavier work.

A band saw consists of a thin band or ribbon of steel with teeth cut in one edge, and when in use it is mounted on two wheels like a belt and made to travel at a rapid rate of speed by revolving the wheels. For scroll work its advantage over the reciprocating and jig saw lies mainly in the increased and uniform speed at which the saw blade travels which enables the operator to better control the work in hand and to feed the material toward the saw constantly, and thus to turn out more and better work than would be possible with a reciprocating saw cutting on the downward stroke only.

In sawing logs the advantage of a band saw as compared with a reciprocating saw may be judged when we state that the band saw blade travels at a rate of from 8,000 to 10,000 feet per minute, whereas, a reciprocating saw making 200 strokes of 18 inches to the minute, would only have a cutting speed of 300 feet per minute. The band saw traveling more than 20 times as fast as the reciprocating saw, will naturally perform nearly or quite as much work as 20 reciprocating saws. The single reciprocating saw, which evidently was the primitive saw mill, because of its limited capacity was succeeded by what is termed in the United States a gang, in Europe, a log frame, and in Canada a gate. The gang saw mill for log sawing consists of a sufficient number of reciprocating saws placed side by side in a frame to saw completely at the one operation an entire log. The advantage of the band log mill over the gang lies in its adaptability to the sawing of each log to the best advantage; as but one cut is made at a time, and as the face of the log is exposed to the view of the sawyer, he can judge through what portion of the log the next cut should be made to yield the best results.

Another form of saw mill is that known as the rotary mill or circular saw mill. Both the circular and band log mills are provided with traveling carriages on which the log is placed, secured and fed past the saw. The circular saw has possibly as great a capacity as the band, but it is very wasteful, because a circular saw large enough to saw plank from the side of a log of medium size needs to be of such large diameter that in order to support it in the cut the saw is made very thick, and thus removes an immense saw kerf. Not only this, but it has been found impossible to saw with this kind of mill with sufficient accuracy to meet the pres-

BANDA — BANDAGE

ent market requirements. The circular saw while popular in the past is known to have wasted nearly or quite 25 per cent of the product of the log in saw kerf and poorly sawn timber. The band saw, on the other hand, combines the accuracy of the reciprocating saw with the capacity of the circular saw. The success of the band saw is due: first, to the acquired skill of the saw maker in turning out saw blades of suitable temper to retain a good cutting edge and at the same time flexible enough to pass over the wheels without cracking; second, to the skill of the saw filer in fitting his saws. Band saws require to be "tensioned" from time to time when in use. By the word tension is meant the expanding of the central portion of the saw blade either by the use of a hammer and anvil or by the use of what is termed stretching rolls.

The use of the band saw has also brought forth an extensive line of saw fitting tools such as saw "swages" which are designed to expand the points of the teeth, "pressure side dressers" or "tooth formers" or "shapers" which are intended to give form to the swaged points of the teeth, automatic saw sharpeners, etc. With the use of these improved appliances it was found that thinner and thinner band saw blades could be used, and hence the band saw has come into general use for "resawing purposes," that is, the sawing of planks and boards into two or more thinner pieces. For this purpose it is well adapted. The plank or boards to be resawn are fed to the saw by means of rollers. Saws as thin as .02 of an inch in thickness are successfully used. Such saws remove a saw kerf of practically one thirty-secondth of an inch. The advantage of the band resaw lies in the fact that it is practical to use the thinnest and most delicate saw of this type and still have it of practical use and service as a tool.

EDWARD C. MERSHON,
Of W. B. Mershon & Company, Saginaw, Mich.

Ban'da, a town of India, in the northwest provinces, capital of a district of the same name, on an undulating plain near the Ken River, 95 miles southwest of Allahabad. It is a straggling, ill-built place, but with clean streets, and contains a large number of mosques and temples. It was formerly an important cotton market. There are cantonments about a mile distant from the town. Pop. (1900) 29,000.

Banda Islands, a group belonging to Holland, in the Indian Archipelago, south of Ceram; the largest, Great Banda, being 12 miles long by 2 broad, while Goenong Api is an active volcano nearly 8,000 feet high. They have a rich soil admirably adapted for the cultivation of the nutmeg, which is their chief product, others being coconuts and sago. The total area of the group is about 19 square miles and the capital of the group is Banda, the seat of the assistant resident. Tatti wood is grown on the island of Rosingen. Pop. about 8,000, of whom less than 600 are Europeans.

Banda Oriental, a state of South America, originally settled by Spaniards from Buenos Ayres, claimed by Brazil, but, after a war, made in 1825 into the independent State of Banda Oriental del Uruguay—that is Eastern Bank of the Uruguay, now usually called simply Uruguay (q.v.).

Vol. 2—20

Bandage, a surgical wrapper applied to some part of the body. Bandages are employed for a variety of purposes. One of their chief uses is to secure dressings or splints. Another is to give support to a limb or to restrain its movements, or to exert pressure upon it so as to aid in restraining bleeding at some point; or a bandage may be used to promote healing, as in the case of ulcers, or to aid in the removal of swelling. In these latter cases the bandage must be applied with a considerable degree of tightness, and great care must be exercised that it be evenly put on, and that the tightness with which it is drawn does not give rise to disturbances of the circulation by undue and irregular pressure. Suppose, for instance, the arm is being bandaged from the hand well up over the upper arm. The arteries which carry the blood down the limb are for the most part deeply seated and well protected by muscles, so that they are practically unaffected by any ordinary degree of pressure on the surface. But many of the veins which carry the blood back to the heart up the limb run immediately under the skin, and will be pressed upon considerably by a bandage applied round the arm. If the bandage is made too tight at the elbow, say, the veins will be compressed and the blood will flow less easily along them at that point than it does lower down where the pressure is less. The consequence will be that the blood will be hindered in passing up from the hand; and as blood is all the time being carried down to the hand in the arteries, which are unaffected, the veins in the forearm and hand will become swollen and gorged with blood. The pressure of blood in the veins will become so great that fluid will be pressed out of the finer vessels into the surrounding tissues, and the hand will become swollen, puffy, and dropsical, while much pain will be experienced. If the tight turns of the bandage are now loosened, the veins will again offer a free passage to the blood, and the swelling and pain will gradually subside. The proper method in such a case is not necessarily to bandage loosely, but to bandage uniformly, beginning with the requisite degree of tightness at the very extremity of the limb, and continuing evenly and regularly upward. A general rule in bandaging a limb, then, is: never let the bandage be tighter up the limb than it is at the extremity; apply it firmly and evenly at the extremity and carry it up uniformly. To this may be added, as a second rule, that if a bandage requires to be tightly applied in the course of a limb it must be begun at the extremity. It is specially necessary to follow these rules when the bandage is applied to secure a splint, since it must be tight enough to keep the splint in accurate position, or to keep a pad firmly applied over a wound for the arrest of bleeding. Bandages usually consist of strips of unbleached or bleached calico, linen, flannel, muslin, etc. Elastic bandages and india-rubber bandages are also in use for particular cases. The material should be torn into strips of the requisite breadth, and the bandages should have no hem or edging, as this would prevent them stretching equally in all directions. The strips should be rolled up for use into firm rollers, a roller bandage being usually 6 yards long, though often more. They are of different breadth, most commonly 2½ or 3½ inches. For the chest and abdomen the breadth should be 4½ inches; for

BANDAI-SAN — BANDICOOT

the fingers three-quarters of an inch. The triangular bandage is of all others the one made use of for rendering temporary aid in cases of accident, and, through the training afforded by "first aid to the injured" associations, is now familiar to almost everyone. The bandage is made of a square yard of linen or calico halved diagonally, each half having of course two sides 36 inches each in length, with a base of fully 50 inches. When it is desired to exert very considerable pressure upon a part for a length of time, or when it is desired to keep a limb or a joint motionless for some time, this may be done without the use of splints by stiffening the bandage with starch or plaster of Paris.

Bandai-San, bân'di-sân', Japan, a volcano on the island of Nippon, 140 miles north of Tokio. Its summit consists of several peaks, the highest of which is 6,035 feet above the ocean and 4,000 feet above the surrounding plain. On 15 July 1888 there was a terrible explosion of steam which blew out a side of the mountain, making a crater more than a mile in width, and having precipitous walls on three sides. The debris of broken rock and dust poured down the slope and over an area of 27 square miles, killing 461 persons and covering a number of villages.

Bandajan', a pass over a range of the Himalayas, in Cashmere, 14,854 feet above sea-level.

Bandan'a, a cotton handkerchief, having a dark ground of Turkey-red, blue, or purple, variegated with simple patterns of white or bright yellow, their bright colors making them a favorite head-covering for southern negro women. These handkerchiefs were originally manufactured in the East Indies; but the beauty and durability of their colors caused such a demand that the manufacture of them was established elsewhere. The process is first to dye the cloth of a dark color, commonly Turkey-red, which serves as a ground. The white spots constituting the pattern are afterward produced by discharging the color with a solution of chlorine. In order to confine the discharging fluid to the exact points to be operated upon, the pattern is cut out in leaden plates, upon which the fluid will not act, and as many handkerchiefs or pieces of cloth as are to be operated upon are enclosed between pairs of these patterns, and subjected to enormous pressure, the discharging fluid being run in at the top and prevented by the pressure from spreading, so that the pattern is brought out clean on the spots subjected to the action of the fluid.

Bande Noire, bând nwâr, an appellation given during the French Revolution to companies of capitalists and speculators who bought up the forfeited estates of the Church and nobility. They were considered by many as hordes of Vandals bound to destroy the monuments which kings, nobles, and religious orders had erected all over France; and thence the scornful denomination, which was continued nearly up to 1830. But while the Bande Noire removed some castles and monasteries which ought to have been preserved as relics of art and religion, they did much toward the prosperity of the country by improving unproductive lands and disseminating among the people landed property which previously was concentrated in the hands of privileged classes. The term was

originally applied to a body of German soldiers who were employed in the Italian wars by Louis XII. of France, and who received the name from carrying black colors after the death of a favorite commander. The appellation was also assumed for the same cause by different Italian and French troops in the 16th century.

Ban'ded Peak, or **Mt. Hesperus**, a summit of the San Juan Mountains, in southern Colorado; altitude, 12,860 feet.

Bandel, bân'dêl, **Ernst von**, Bavarian sculptor: b. Ansbach, 1800; d. near Donaworth, 25 Sept. 1876. He studied art at Munich, Nuremberg, and Rome; and from 1834 lived chiefly at Hanover, engaged off and on, for 40 years, on his great monument of Arminius, near Detmold, 90 feet high, which was unveiled by the Emperor Wilhelm 16 Aug. 1875.

Bandelier, bân-dê-lêr, **Adolph Francis Alphonse**, Swiss-American archæologist: b. Berne, 6 Aug. 1840; settled early in the United States, where he has done important work under the direction of the Archæological Institute of America. His studies have been chiefly among the Indians of New Mexico and Arizona, Central America, and Mexico. He has published many papers on the subject. He is also the author of 'Art of War and Mode of Warfare' (1877); 'Social Organization and Government of Ancient Mexicans' (1878); 'Tenure of Lands and Inheritances of Ancient Mexicans' (1878); 'An Archæological Tour into Mexico' (1885); a novel of Pueblo Indian life, 'The Delight Makers'; etc.

Bandello, bân-dêl'ô, **Matteo**, Italian novelist: b. about 1480; d. 1561. He studied at Rome and Naples and applied himself almost exclusively to polite literature. In his youth, he was a Dominican monk, and was entrusted with the education of the celebrated Lucrezia Gonzaga. After the battle of Pavia he was banished from Italy as a partisan of the French, and Henry II. of France gave him in 1550 the bishopric of Agen. He left the administration of his diocese to the Bishop of Grasse, and employed himself, at the advanced age of 70, in the completion of his novels, of which he published three volumes in 1554; a fourth was published in 1573, after his death, which took place in 1561. He also published some poems. His novels are in the style of Boccaccio and are characterized by even greater license.

Ban'deras, **Rio de**, a river of Mexico, on the east coast; so called (river of flags) because, when discovered in 1518 by Juan de Grijalva, the natives waved white flags at the end of their spears in token of friendship.

Bandettini, bân-dêt-tê-nê, **Teresa**, Italian poet: b. Lucca, 12 Aug. 1763; d. 1837. Beginning life as a danseuse, she discovered her poetic talent as if by accident, and came to be known and honored in most parts of her country. She was especially gifted in improvising verse. She was called the Amarilla Etrusca. Of her finished poems there remain 'La Morte de Adanoide'; 'Il Polidoro'; 'La Rosmunda'; and some shorter pieces.

Ban'dicoot. 1. A large dark-colored rat (*Nesokia bandicota*) of southern India and Ceylon, where it is known as the "pig-rat" on account of the taste of its flesh, which is a favorite article of food among the natives of the

BANDIERA — BANFFSHIRE

dry, hilly districts it frequents. As its food is chiefly grain and roots it does much harm to gardens; and it is also destructive to poultry. It has the habit of storing rice in its underground nests against the famine of the dry season.

2. In Australia, a small marsupial with a long, narrow head and muzzle belonging to the family *Peramchidæ*. Many species are scattered throughout Australasia. They live in warm nests underground, and feed upon insects, worms, and vegetable food. The hare-like marsupials of the closely allied genus *Perogale* are known as rabbit-bandicoots, and, like the other, frequently injure vegetable gardens. Consult Gould, 'Mammals of Australia' (London 1863).

Bandiera, bân-dî-ă'ra, **Attilio** and **Emilio**, two brothers of a Venetian family, lieutenants in the Austrian navy, who attempted a rising in favor of Italian independence in 1843. The attempt was a failure, and they fled to Corfu; but, misled by false information, they ventured to land in Calabria with 20 companions, believing that their appearance would be the signal for a general insurrection. One of their accomplices had betrayed them, and the party was captured at once by the Neapolitan police. Attilio and Emilio were shot, along with seven of their comrades, in the public square of Cosenza, 25 July 1844.

Bandinelli, bân-dē-nēl'-lē, **Baccio**, Italian sculptor: b. Florence, 1493, the son of a goldsmith; d. 1560. He learned his art under the sculptor Rustici, but modeled his style after that of Michael Angelo, whom he vainly attempted to rival and whom he hated with life-long hatred. He was patronized by the Medici, and in honor of the presence of Leo X in Florence he executed the model of a colossal statue of Hercules which was intended to surpass the David of Michael Angelo. Another work of his was an inferior copy of the Laocoon group for Francis I. He produced also Hercules and Cacus (at Florence), a somewhat heavy work, 88 figures of apostles, prophets, and saints in the choir of the cathedral at Florence, a Bacchus, an Adam and Eve, etc.

Ban'dit (It. *bandito*), originally an exile, banished man, or outlaw; and hence, as persons outlawed frequently adopted the profession of brigand or highwayman, the word came to be synonymous with brigand. Of all European countries Italy has perhaps been most infested with banditti. They used to form a kind of society of themselves, subjected to strict laws, and living in open or secret war with the civil authorities. Peter the Calabrian, the most terrible among these robbers, in 1812 named himself, in imitation of the titles of Napoleon, "emperor of the mountains," "king of the woods," "protector of the conscribed," and "mediator of the highways from Florence to Naples." The government of Ferdinand I. was compelled to make a compact with this bandit. One of the robbers entered the royal service as a captain in 1818 and engaged to take captive his former comrades. Subsequently adventurers of all kinds united with them. The Austrian troops which occupied Naples were obliged to send large detachments to repress them. The bandits used to exact from strangers and natives a sum of money for protection, and give them in return a letter of

security. In Sicily the Prince of Villa Franca declared himself, from political and other views, the protector of bandits; he gave them a livery and treated them with much confidence, which they never abused. Banditti are still active in Italy, Sicily, Turkey, and elsewhere.

Bandolier', a large leathern belt or bald-ric, to which were attached a bag for balls and a number of pipes or cases of wood or metal covered with leather, each containing a charge of gunpowder. It was worn by ancient musketeers, and hung from the left shoulder under the right arm with the ball bag at the lower extremity, and the pipes suspended on either side. The name is now given to a similar belt by which a number of cartridges are conveniently carried.

Ban'don, or **Bandonbridge**, Ireland, a town on the Bandon, 20 miles southwest of Cork. It is well built, but has no edifice of special note. Distilling, brewing, flour-mills, etc., are carried on. Pop. about 4,000.

Bandon, a river of Ireland which rises in the Carberry Mountains, and at its mouth forms the harbor of Kinsale. Spenser describes it as "the pleasant Bandon, crowned by many a wood." It has a course of 40 miles, for 15 of which it is navigable to Innishannon, four miles below Bandon.

Bandong, bân'dông, or **Bandung**, a flourishing commercial town in the centre of the western end of Java, in the vicinity of the volcano Gunong Guntour. Since 1864 it has been the capital of a province known as the Preanger Regencies.

Bandtke, bant-kē, or **Bandtkie**, **Jerzy Samuel**, Polish historian: b. Lublin, 24 Nov. 1768; d. Cracow, 11 June 1835. He was author of 'History of the Polish Nation' (1820), and professor in the University of Cracow, 1811-35.

Bane'berry. See *ACTÆA*.

Banèr, ba-nār', **Johan Gustafsson**, Swedish general in the Thirty Years' war: b. 1596; d. 1641. He made his first campaigns in Poland and Russia, and accompanied Gustavus Adolphus, who held him in high esteem, to Germany. After the death of Gustavus in 1632 he had the chief command of the Swedish army, and in 1634 invaded Bohemia, defeated the Saxons at Wittstock, 24 Sept. 1636, and took Torgau. He ravaged Saxony again in 1639, gained another victory at Chemnitz, and in 1640 defeated Piccolomini. In January 1641 he very nearly took Ratisbon by surprise.

Banff, bânf, Canada, a pleasure and health resort in Alberta, on the Canadian P. Ry. There are sulphur springs, fine hotels, and all the requirements of a mountain resort. The permanent population of the village is less than 300, but during the season the region is full of visitors.

Banffshire, Scotland, a county in the north, bounded on the north by the Moray Firth, on the west by the county of Moray and part of Inverness, on the south and east by the county of Aberdeen. The soil is for the most part a rich loam or deep clay. The principal rivers are the Spey and Deveron, with the Isla, a tributary of the former, and the Avon and Fiddich of the latter; besides which there are many other main and tributary streams. The

BANG — BANGKOK

mountains rise in altitude as they recede from the sea, the most celebrated being Cairngorm, which is 4,095 feet high. The principal crops are barley, oats, turnips, and potatoes, little wheat being raised. Special attention is paid to the cultivation of turnips, the chief object of the farmer being the rearing and feeding of cattle. The total area of Banffshire is 410,000 acres. Nearly two fifths of the total surface is under cultivation, and about one fifth is occupied by woods and plantations. Since about the middle of the 19th century large tracts of formerly waste land have been reclaimed. Fishing is a staple industry. The salmon caught in the Spey and Deveron constitute an important article of traffic, the valued rental of the Duke of Richmond's salmon fishings in the former being over \$60,000 a year. Banffshire possesses several woolen factories, tanneries, rope and sail works, ship-building yards, breweries, lime-works, and many distilleries, the whiskey being generally known under the name of Glenlivet, after a glen in the county. Among the natural productions limestone is the most prevalent. Serpentine also abounds in several places, especially at Portsoy, where it is known as "Portsoy marble"; it is wrought into vases and other ornaments. Ironstone and manganese also occur, and Scotch topazes or cairngorm stones are found on the mountains in the south of the county. Pop. (1901) 61,439.

Bang, bång, Hermann Joachim, Danish novelist: b. 1857. He came into notice about 1879, since which time he has published a number of novels and some poems. 'Hopeless Generations' (Haablose Slægter); 'Eccentric Tales' (Excentriske Noveller); 'Under the Yoke' (Under Aaget); 'Ten Years' (Ti Aar); and 'By the Roadside' (Ved Veien), are the titles of some of them. The last named is considered the masterpiece.

Bang, a drink. See BANGUE.

Bangalore, bân-gā-lôr', a town of Hindustan, capital of Mysore, 70 miles northeast of Seringapatam. It stands on a plateau 3,000 feet above sea-level, and is divided into two parts, the old native town and the cantonments. The chief buildings are the government house (where the British resident lives), the new public offices, the palace of the maharajah, the central jail, etc. There is a fine public pleasure-garden. In the old town stands the fort, reconstructed by Hyder Ali in 1761, and captured by Lord Cornwallis in 1791. Latterly the town has greatly prospered. There are manufactures of silks, cotton cloth, carpets, etc. Bangalore is noted for its salubrity. Pop. (1901) about 160,000.

Bange, bânzh, Valerand de, French artillery colonel: b. Balignicourt, 1833. In 1873 he reconstructed both the light and heavy field pieces of the day, and his models were adopted by the French army in 1879. In 1884 he was the successful competitor with Krupp for the contract to supply field pieces to the Servian government. His gun has been preferred also by England, Sweden, and Italy. He was the first to employ effectively the screw principle in the mechanism of the breech block. See Hennébert, 'L'Artillerie Krupp et l'Artillerie de Bange' (1886).

Bangkok', or Bankok, the capital of the kingdom of Siam, extending for 3 or 4 miles

on both sides of the Menam, which falls into the Gulf of Siam about 15 miles below. It consists of three parts—the town proper, the floating town, and the royal palace. The town proper occupies an island 7 or 8 miles in circuit, and is surrounded with walls and bastions; situated in the midst of gardens and luxuriant foliage it presents a very picturesque appearance. The floating town consists of wooden houses erected on bamboo rafts moored to the bank in rows eight or more deep. The palace, occupying an island in the river, is surrounded by high walls. Though the general character of the buildings is not imposing, numerous temples, glittering with gilding and terminating in lofty spires, are seen in many quarters. The trade, both inland and foreign, is very extensive. The population is about 800,000, nearly half of whom are Chinese, the others including Burmese, Annamese, Cambodians, Malays, Eurasians, and Europeans. The foreign trade of Siam centres in Bangkok and is mainly in the hands of the Europeans and Chinese. The approach to Bangkok by the Menam, which can be navigated by ships of 350 tons' burden (large sea-going ships anchor at Paknam, below the bar at the mouth of the river), is exceedingly beautiful. As the town is neared, numerous temples present themselves, and floating houses become common; and finally the whole city, with its rich gardens and shining temples and palaces, bursts full upon the view. Stone buildings are used only for the royal palaces, some noblemen's houses, monasteries, and the dwellings of Europeans. A large number of the houses float on rafts fastened by ropes to poles; most of the trade of the city is carried on upon the river. The internal traffic of Bangkok is chiefly carried on by means of canals, there being only a few passable streets in the whole city. Horses and carriages are rarely seen, except in the neighborhood of the palaces. The native houses on land,—of bamboo or other wood, like the floating houses,—are raised upon piles, six or eight feet from the ground, and are reached by ladders. The circumference of the walls of Bangkok, which are 15 to 30 feet high and 12 broad, is about 6 miles. Bangkok is the constant residence of the king. The palace is surrounded by high walls and is nearly a mile in circumference. It includes temples, public offices, accommodation for officials and for some thousand soldiers, with their necessary equipments, a theatre, apartments for a crowd of female attendants, and several Buddhist temples or chapels. Several of the famous white elephants are kept in the courtyard of the palace. Throughout the interior are distributed the most costly articles in gold, silver, and precious stones. The temples of Bangkok are innumerable, and decorated in the most gorgeous style, the Siamese taking a pride in lavishing their wealth on them. In the neighborhood of Bangkok are iron mines and forests of teakwood. The chief exports are rice, sugar, pepper, cardamoms, sesame, hides, fine woods, ivory, feathers, and edible birds' nests. The imports are tea, manufactured silks, and piece goods, opium, hardware, machinery, and glass-ware. The United States has a resident consular agent. Among recent evidences of progress may be mentioned the erection of steam mills, the introduction of gas into the royal palaces and many noblemen's houses, and the estab-

BANGOR

lishment of a regular mail to Bangkok in 1884. Siam joined the International Postal Union in 1885, and in 1890 a parcel post service (with Singapore and Europe) was established. Bangkok is now connected with Burma and Cambodia by telegraph, and is the centre of a local system of (in 1893) 1,780 miles. A short railway at Paknam (on the coast) was opened in 1893; another line of 165 miles is being made; and others to the northern provinces have been surveyed and sanctioned. In 1893 a treaty was concluded at Bangkok, by which Siam made large cessions to France, two French gunboats having forced their way to the capital after an ineffective defense.

Ban'gor, Ireland, a seaport town, county Down, situated on an acclivity on the south side of Belfast Lough, four miles northwest of Donaghadee. It consists of three principal and several smaller streets, and has an Episcopal church, a Methodist and a Roman Catholic chapel, and two Presbyterian churches; an endowed school, six national schools, a Protestant hall, and a branch of the Belfast Bank. The male population is chiefly employed in seafaring pursuits, the females in hand-sewing in all its branches. Bangor is a favorite bathing resort. Bangor Abbey was founded by Saint Congall in 555 A.D., and was destroyed by the Danes in the 9th century. The parish church now occupies the site. Pop. in 1891, 3,834.

Bangor, Maine, the chief city of eastern Maine, is a port of entry and the seat of Penobscot County. The city is on the west bank of the Penobscot River, across its affluent the Kenduskeag, and at the head of navigation, about 28 miles from Penobscot Bay. It is on the Maine Central, Bangor & Aroostook and several other railroads, with steam and electric lines radiating in all directions; is on the main line from Boston to Saint John and Halifax, and also has direct steamship connection with Boston, being the terminus of the Bangor Division of the Eastern Steamship Company. Bangor is 76 miles northeast of Augusta, 137 miles northeast of Portland and 246 miles from Boston.

Trade and Commerce.—Situated near the geographical centre of Maine and at the head of navigation on the largest river of the State, Bangor occupies a highly favored position and one destined to be even more commanding with the growth and development of the expansive territory north and east and tributary to her. As the shire town of a county embracing some 75,000 inhabitants, as the trade centre and shipping point of a large and rich agricultural section and for many thriving industrial communities; as a point of convergence for numerous important railway and steamship lines, and a consequent tarrying place for great numbers of tourists, sportsmen and commercial travelers; these together with the busy commerce of its port, the metropolitan character of its hotels and the compactness of its business section, give to the city a much more populous appearance than the above figures would indicate. Bangor has a fine harbor, easily accessible for vessels of large size; and the scene in the open season along the docks, where crafts of varying rig are loaded with lumber, ice and the diversified products of this region, is an animated one. Although nearly 30 miles from the bay and 60 miles from the ocean, the tide rises about 17

feet, and there is a sufficient depth of water to float the largest of ocean steamships. The Penobscot River, whose waters unite with those of the bay of the same name, is a noble water highway, rising 300 miles away amid the mountains and forests of northwestern Maine. In the 8,200 square miles drained by the Penobscot there are 1,604 tributary streams indicated on the State map, and 467 lakes and ponds. Bangor is one of the greatest lumber markets in the north, there being tributary to the city the great forests of spruce traversed by the Penobscot and down which the logs are floated; and has every sort of manufactory of wood and allied products,—saw, planing, woodpulp, and molding mills; factories of furniture, carriages, trunks, valises, agricultural implements, boots, shoes and moccasins, clothing, dairy products, etc., with iron foundries, machine shops, shipyards, flour mills and pork-packing establishments. Ice-cutting is also an important industry, Penobscot ice being exceptionally pure.

Manufactures and Industries.—Bangor's manufacturing establishments number in the vicinity of three hundred, embracing about one hundred different kinds of industries and employing several thousand hands. These figures are, however, inadequate to correctly portray the city's manufacturing interests, as many of the most important establishments, including all the large saw mills but one, are outside the city's limits. Therefore, while the manufactures of these mills are purely Bangor products, the plants themselves and most of the employees belong properly to other towns. Among Maine's many industries the lumber trade still holds a foremost place. From 1816, in which year about a million feet were cut, down to the present time, there have been cut on the Penobscot waters in the vicinity of 11,000,000,000 feet. The lumber cut on the Penobscot and its tributaries during the winter of 1903-4 aggregated about 210,000,000 feet. Lumber shipments from the port of Bangor during 1903 were 156,509,108 feet against 124,767,646 feet in 1902, and 120,954,897 feet in 1901. In recent years pulp and paper manufacturing has made great advance and numerous pulp and paper mills are now in operation along the Penobscot, from those of the Eastern Manufacturing Company at South Brewer to the immense plant of the Great Northern Paper Company at Millinocket.

In recent years diversified manufactures have been multiplying and many and varied are the products of these establishments. Bangor has one of the largest and most prosperous shoe factories in the State. Here is located a trunk manufacturing establishment which shipped recently a whole trainload of trunks, the largest shipment of trunks ever made by one manufacturer in this country or the world. There are located here great wood-working plants from whence go all over the country the finest designs in interior decorations and architectural wood-working.

Bangor is a trade centre for eight counties, and is connected with their principal places by steam or electric roads, or by water communication. As indicative of the volume of the city's commerce the Bangor Customs District reports the exports for the fiscal year ending 30 June 1903 as \$5,372,939, against \$4,248,430 in 1902, and \$4,170,982 in 1901. The imports for the fiscal

BANGOR

year ending 30 June 1903 were \$1,341,880. In 1903 for the first time in its history the United States Bureau of Statistics reports a shipment to the Midway Islands, located in the distant Pacific, midway between Honolulu and Guam, and it is interesting to note that these goods were shipped from the Bangor Customs District. Exports by vessel from the port of Bangor consist chiefly of fruit box shooks to the Mediterranean, spool bars to Scotland and deals to South America and the United Kingdom. The coal receipts in the port of Bangor aggregated 305,720 tons in 1903 and there were 273 cargoes.

Banks, etc.—Bangor has five national banks, two savings banks, two trust and banking companies, two loan and building associations and two marine insurance companies. There are two daily papers and several weekly and monthly publications. There is a board of trade with attractive rooms at the city hall. The Kenduskeag, flowing through the centre of the city, is spanned by several bridges, and the city is connected with Brewer across the Penobscot by a bridge 1,300 feet long. A dam across the Penobscot just above the city furnishes water supply and power, the city owning both its waterworks and municipal lighting plant. The assessed property valuation of Bangor is \$16,345,000, with a total debt of less than \$1,000,000.

Buildings, etc.—The city has a fine granite custom house and post-office and the recently completed county court-house is a handsome and commodious edifice, a credit to the great county of Penobscot, of which Bangor is the shire town. Bangor's city hall—the Hersey memorial building—is an imposing edifice which reflects credit upon the city. The Bangor public library is one of the foremost institutions of its kind and contains on its shelves upwards of 50,000 volumes. The Bangor opera house is unsurpassed for its beauty and appointments by any outside the largest cities. The Bangor Auditorium Association has erected the largest building of its kind in the State, and here each fall are held the eastern Maine musical festivals. The Eastern Maine General Hospital is one of the important institutions here and Bangor is also the home of the Eastern Maine Insane Hospital. The Bangor Theological Seminary is a time-honored institution of learning, and only nine miles away, in the town of Orono, is the flourishing University of Maine.

Government.—Bangor received a city charter 12 Feb. 1834. The city seal is typical, the rising sun in the background illustrating the Sunrise State, and the spruce tree in the centre portraying the great lumber interests, while in the immediate foreground are gear wheel, anchor and plow, emblematic of manufactures, commerce and agriculture. The government is vested in a mayor, who is elected annually, and a council divided into two chambers. The city has seven wards, and one alderman and three councilmen are chosen annually from each ward, the city government comprising the mayor, seven aldermen and twenty-one councilmen. Most of the appointments and administration offices are subject to the control of the mayor and city council.

History.—Bangor's present site was in the early days the camping-ground of the Tarratines, a famous tribe of Indians. It was in 1769

that Jacob Buswell, Bangor's first white settler, came here from Massachusetts. He was a hunter and boatbuilder, and established his home near the site of Saint John's Roman Catholic Church. The place was for a time known as Kadesquit, afterwards as Condeskeag, and later as Kenduskeag. The locality had been visited by the French as early as 1605, and was one of the many places identified with the mythical Norumbega. Kenduskeag plantation was only a small hamlet at the time of the Revolution and during the time when the British had control of the river the hardships were severe. At the instigation of Rev. Seth Noble, Bangor's first clergyman, the name of Kenduskeag was finally abandoned and Sunbury adopted. With the growth of the place the people became impatient of the plantation organization and delegated Parson Noble to proceed to the General Court at Boston and secure an act of incorporation. Minister Noble was a great lover of music, and the hymn tune of Bangor was such a favorite with him that that name was substituted for Sunbury and the act incorporating the town of Bangor was passed 25 Feb. 1791.

Bangor early gave attention to the matter of improving her transportation facilities, and she had her railroad when most of the proud cities of to-day knew nothing of such things. As early as 1836 her enterprising citizens built a railroad to Old Town, a dozen miles up the river, with a view of aiding the development of her natural resources; and this, one of the earliest railroads in America, prospered for nearly a third of a century. Not only did the city have one of the first railroads in the country, but the pioneer iron steamship constructed in America was built to run to this port and bore the name Bangor. She was built in 1845 on the Delaware, her owners being the Bangor Steam Navigation Company of Maine, and she was designed for passenger and freight service between Boston and Bangor. Within recent years, through the enterprise of some of Bangor's public spirited men, Aroostook County has been brought into direct railroad communication with Bangor through the construction of the Bangor & Aroostook railroad, this system having numerous branches to important points in northern Maine, it having also absorbed the Bangor & Piscataquis railroad. In recent years there has been no more important railroad enterprise inaugurated in New England than that of the Bangor & Aroostook, and under its enterprising and progressive management it has become a potential factor in the development of Bangor and the immense territory stretching to the northward. Bangor business men, ever alert to adopt the newest methods, inaugurated in this city the first electric railroad in Maine and more recently electric roads have been constructed reaching Hampden and South Brewer on the south and Old Town and Charleston on the north. These electric lines bring Bangor and the territory immediately contiguous into close touch, and the benefits accruing therefrom are far-reaching.

Located as the city is, on the west bank of the imperial Penobscot, at its junction with the less pretentious Kenduskeag, the business is largely in the valley, while the surrounding heights afford picturesque sites for residences. The diversified aspect is heightened by the

BANGOR—BANGS

wealth of trees along the residential streets, and few localities are to be found with greater scenic attractions. From the highlands overlooking the city the view is particularly fine, the mountains which fill the eastern horizon making a fitting background to the picture. The Kenduskeag has, through much of its course, very precipitous banks, a notable illustration being the historic Lover's Leap, a mile above the city; and along this picturesque stream are innumerable gems of scenic beauty.

Bangor enjoys the unique distinction of being the only place of its size on the globe where salmon fly-fishing can be successfully practised within the city's limits, and in one season a Bangor lumber manufacturer brought to the gaff and successfully landed twenty-seven salmon, aggregating 500 pounds in weight. The Bangor salmon pool, whence are taken all the salmon caught with a fly on the Penobscot, is situated about a mile above the city and just below the falls that span the river at the Bangor waterworks dam.

Bangor is the home of many sportsmen and is the headquarters in this section for sportsmen's supplies of all descriptions. Nearly all the parties of sportsmen who in the season visit the great wilderness of northern and eastern Maine make this their rendezvous and procure their outfits here. Moose and deer are multiplying rapidly as the result of wise game laws, and Maine is truly the sportsmen's paradise. The records kept by the wardens at Bangor show that during the fall months of 1903 there were shipped to and through the city from the Maine game regions 4,679 deer, 217 moose and 26 bears, the biggest shipment in a single day having been 202 deer and 14 moose.

Population.—In the year 1800 the population of Bangor was 277. From 1830 to 1834 Bangor expanded rapidly and when in the latter year a city charter was adopted the population was about 8,000. The census for 1900 gave Bangor a population of 21,850; the population in 1904 is about 25,000, and with the towns immediately environing, including the city of Brewer across the river, about 40,000.

EDWARD M BLANDING,
Secretary Bangor Board of Trade

Bangor, North Wales, an episcopal city and parliamentary borough, in Carnarvonshire, near the northern entrance of the Menai Strait. It consists chiefly of one principal street about a mile in length, nestling in a narrow valley, but there is also a higher and more modern quarter called Upper Bangor, overlooking the strait. The principal public buildings are the cathedral, the bishop's palace, deanery house, University College of North Wales, training college for teachers, etc. Bangor is the oldest bishopric of Wales, having been founded by Saint Deiniol in 550 AD. He built a cathedral, which the Saxons demolished in 1071, and the new edifice, completed in 1102, was destroyed by fire in 1402. The present structure was in building in 1496–1532; it is of cruciform design, 214 by 60 feet, and has a tower 60 feet in height. Modern improvements have been freely introduced. There are plants for gas and electric lighting, and a free public library. The municipality was incorporated in 1883. The chief local trade is through the Pen-

rhyn slate quarries, in which 3,000 wage-earners are employed. The annual fairs are thronged with buyers and sellers. The fact that the harbor is not suited to large vessels makes the trade by sea of small proportions. Pop. (1901) 11,500.

Bangor, Pa., a borough of Northampton County, 15 miles north of Easton; on the Bangor and Portland and New Jersey Central railways. There are numerous slate-quarries, and the products of the slate-mills, etc., find an extensive market. Pop. (1890) 2,509; (1900) 4,106.

Bangor Theological Seminary (Congregational). It sprang from the Society for Promoting Theological Education, organized in 1810, and chartered in 1812 (for the need at this time see ANDOVER THEOLOGICAL SEMINARY). The seminary was chartered by the legislature of Massachusetts (of which Maine was then a part) February 1814; was opened at Hampden, Me., October 1816; but in 1819 was removed to Bangor and graduated its first class 2 Aug. 1820. In that year the province of Maine was separated from Massachusetts; and the Seminary was conducted as a means for supplying the need in Maine for pastors and teachers. It was at first conducted on the English plan, but a few years later remodeled its courses to suit American needs. Organized to supply the churches of Maine with educated pastors, it has furnished over half their number ever since and does so still. Up to 1903 it had graduated 808 students and given partial course to 255 others. It has endowments which furnish aid to all needy students, and a library of 23,500 volumes; and in 1903 had six professors and 23 students. The course is one of three years, and the Seminary is open to Christians of every denomination. There is an endowment of \$10,000 for the Bond lectureship, which is not limited to the subjects common to such lectureships, but includes also instruction in scientific directions. In recognition of the close connection between the Seminary and the Maine churches, the Seminary trustees, in 1827, invited the general conference of the Congregational Churches to send yearly a committee to the institution, and a board of visitors has since been annually appointed by the State conference.

Bango'rian Controversy, a controversy stirred up by a sermon preached before George I in 1717, by Dr Hoadly, bishop of Bangor, from the text "My kingdom is not of this world,"—in which the bishop contended in the most pronounced manner for the spiritual nature of Christ's kingdom. The controversy was carried on with great heat for many years, and resulted in an enormous collection of pamphlets. See HOADLY, BENJAMIN.

Bangs, **Heman**, Methodist Episcopal clergyman: b. Fairfield, Conn., April 1790; d. New Haven, Conn., 2 Nov. 1869. He became a member of the New York Annual Conference in 1815; preached in pulpits in New York and Connecticut; was one of the founders of Wesleyan University, Middletown, Conn., and one of the most effective preachers in his Church.

Bangs, **Isaac Sparrow**, American soldier: b. Canaan, Me., 17 March 1831. He entered the Union service as a private 9 Aug. 1862; became

BANGS — BANISHMENT

captain in the 20th Maine infantry, August 1862; lieutenant-colonel of colored troops, February 1863; colonel of the 10th U. S. colored heavy artillery, November 1863, until honorably discharged 19 July 1864. He took part in the Maryland campaign of September and October 1862, and was present at the battles of Antietam, Sheperdstown Ford, and Fredericksburg; was with the expedition to Ellis and Richard's fords, and served through Burnside's second campaign. Later he was at the siege of Port Hudson, La., and commanded the defense of New Orleans. For his meritorious services he was brevetted brigadier-general of volunteers, 13 March 1865.

Bangs, John Kendrick, American humorist and editor: b. Yonkers, N. Y., 27 May 1862. He was one of the founders of 'Life,' and has long been famed for his light verse and humorous stories, among which may be mentioned 'Coffee and Repartee' (1886); 'New Waggings of Old Tales,' with F. D. Sherman (1887); 'The Idiot' (1895); 'Mr. Bonaparte of Corsica' (1895); 'Water Ghost, and Other Stories,' 'The Mantel-Piece Minstrels,' 'The Bicyclers and Other Farces,' 'A Houseboat on the Styx,' and 'A Rebellious Heroine' (1896); 'The Pursuit of the Houseboat' (1897); 'Enchanted Typewriter' (1899); and 'Uncle Sam, Trustee' (1902). He became editor of 'Harper's Weekly' in 1900, of the 'Metropolitan Magazine' in 1903, and of 'Puck' in 1904.

Bangs, Lemuel Bolton, American physician: b. New York, 9 Aug. 1842. He was graduated at the College of Physicians and Surgeons in 1872; was professor of genito-urinary diseases in the Post-Graduate Medical School and Hospital of New York, and later at Bellevue Hospital Medical College; and was consulting surgeon to a number of hospitals in New York. He was president of the American Association of Genito-Urinary Surgeons (1895), and the editor of the 'American Text-Book of Genito-Urinary Diseases,' etc.

Bangs, Nathan, clergyman and author: b. Stratford, Conn., 2 May 1778; d. New York, 3 May 1862. He entered the Methodist ministry in 1801. In 1820 he became head of the Methodist Book Concern, which he reorganized thoroughly, paying off its debts, reentering its business, and putting it on a paying basis. He was also charged with the censorship of all its publications. He edited the 'Christian Advocate' and the 'Methodist Magazine'; was a founder and secretary of the Methodist Missionary Society; president of Wesleyan University, Middletown, Conn., in 1841; and in pastoral work from 1842 until his retirement in 1852. His chief work was 'A History of the Methodist Episcopal Church, 1776-1840' (4 vols. 1839-42); others are: 'Errors of Hopkinsianism' (1815); 'Predestination Examined' (1817); 'Original Church of Christ' (1836); 'State and Responsibilities of the Methodist Episcopal Church' (1850). Compare his life by A. Stevens (1863).

Bangue, or **Bang**, a drink much used throughout the East as a means of intoxication, prepared from the dried leaves of the Indian hemp, which are also called by this name. See **HASHISH**.

Bangued, bǎn-gād', Philippines, the capital of the province of Abra, Luzon, 236 miles north of Manila. Pop. (1898) 13,417.

Bangweolo, bǎng-wē-ō'16 (also called **BEMBA**), a great Central African lake, discovered by Livingstone in 1868, which is 150 miles long by 75 wide, and 3,700 feet above the sea. The Chambeze, which flows into it, and the Luapula, which issues from it, constitute the head-stream of the Kongo. The shores are flat, and parts of the lake are mere marsh. In the northwestern part are four large islands inhabited by the Mboghwa, a race of fishermen and herdsmen. On its southern shore Livingstone died.

Ban'ian, or **Ban'yan** (from Sanskrit *banij*, a merchant), the name commonly given by Europeans to Hindu merchants, brokers, etc., in Bengal and western Hindustan. They are often men of great wealth, and carry on most extensive dealings, their operations extending as far as the borders of the Russian and Chinese territories, the Persian Gulf, and Eastern Africa. They are great travelers, and have counting-houses in almost every trading town of importance in Asia. English sailors call *banian days* those days on which they have no flesh meat. Probably the name has a reference to the habits of this class; because, before people were acquainted with the abstinence of all the Hindus, it was thought to be confined to the Banians.

Banian Tree. See **BANYAN**.

Banim, bā'nim, **John**, Irish writer: b. 1800; d. 1842. He early exhibited a taste for literature, and before his 20th year wrote a play called 'Damon and Pythias,' which was afterward performed at Drury Lane. His fame rests on his novels, particularly the 'O'Hara Tales,' in which Irish life in all its features is admirably portrayed.

Banim, Michael, Irish novelist: b. Kilkenney, 5 Aug. 1796; d. Booterstown, 30 Aug. 1874. He claimed to have written 13 out of the 24 books of fiction confusedly associated with the names of John and Michael Banim, and called himself the author of 'Crohoore of the Bill Hook,' one of the most popular of the 'O'Hara Tales'; 'The Ghost Hunter' (1833); 'Father Connell' (1842), and 'The Town of the Cascades' (2 vols., 1864).

Ban'ishment (the act of putting under ban, proclamation, as an outlaw), a technical term in Scotch criminal law for the punishment of sending out of the country under penalties against return. This punishment was formerly much used in various forms,—for example, banishment to the plantations or colonies; to England (even after the Union); from a particular county in Scotland, etc. Sometimes capital punishment was commuted to banishment for service in a foreign war. The old Scotch doom of deportation was gradually merged in transportation under various British statutes. At present, banishment is still the statutory sentence in cases of celebrating clandestine marriages.

'Banishment is sometimes used in the sense of expulsion or deportation by the political authority on the ground of expediency, as well as in the sense of transportation or exile by way of punishment for crime.' 3 Am. & Eng. Enc. Law (2d Ed.) 770. The United States

BANISTER—BANK HOLIDAYS

supreme court decided in the case of *Fong Yue Ting v. United States*, 149 U. S. 698, that the right to exclude or to compel aliens, or any class of aliens, absolutely or upon certain conditions, in war or in peace, is an inherent and inalienable right of every sovereign and independent nation. The idea of banishment occurs in the ostracism and petalism of Greece, and the relegation, exile, and deportation of Rome. It was generally accompanied by forfeiture of civil rights. In England, voluntary banishment was called abjuration.

Ban'ister, John, Anglo-American scientist: b. England; d. 1692. He settled in the West Indies, and later in Virginia, in the vicinity of Jamesburg, where he devoted himself to the study of botany. He was a contributor of a catalogue of Virginia plants to Ray's 'History of Plants,' in 1660. The genus *Banisteria* was named in his honor. His publications include 'Observations on the Natural Productions of Jamaica'; 'The Insects of Virginia'; 'Curiosities in Virginia,' etc.

Banister, John, son of the preceding: b. Virginia; d. 1787. He was educated in England and studied law there; became colonel in the Virginia militia; was a member of the Virginia Assembly, and prominent in the patriotic conventions of the Revolutionary period; was a representative from Virginia in the Continental Congress in 1778-9, and one of the signers of the Articles of Confederation.

Banjarmassin, ban-yarmas'-sen, Borneo, a town near the southeastern angle of the island, under the government of the Dutch, on an arm of the Banjar, about 14 miles above its mouth. Owing to the marshy ground and frequent inundations of the river the houses are built on piles, and many of them on rafts, the front next the river being used as a shop or stall on which wares are exposed for sale. On market days the water is covered with skiffs, having a single individual in each, moving about selling vegetables, etc. The people are continually on the river, all necessities being purchased at these floating markets, and all business being done on the water. In every respect it is a floating town, possessing neither carriages nor horses; the only animals kept being pigs, goats, ducks, geese, and fowls. The houses of the European functionaries, the government buildings, and the fort, are built partly of stone and partly of wood. The fort Tatas is surrounded with palisades, and contains the resident's house, the magazines, and barracks. Exports are pepper, benzoin, bezoar, ratans, dragon's blood, birds' nests, iron, and straw mats very artistically made; and imports rice, salt, sugar, opium, coral, Chinese porcelain, silk, cutlery, gunpowder, etc. Pop. about 35,000.

Ban'jo (a negro corruption of *bandore*, Italian, *pandora*, from Greek *pandoura*, a three-stringed instrument), the favorite musical instrument of the negroes of the southern States, and now widely popular elsewhere. It is five-stringed, has a body like a tambourine, and a neck like a guitar, and is played by stopping the strings with the fingers of the left hand and twitching or striking them with the fingers of the right. The upper or octave string, however, is never stopped.

Bank, primarily an establishment for the deposit, custody and repayment on demand, of money; and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. The term is a derivative of the *banco* or bench of the early Italian money dealers, being analogous in origin to the terms *trapezitai* (*trapeza*, a bench or table) applied to the ancient Greek money-changers, and *mensarii* (*mensa*, a table) applied to the public bankers of Rome. See **BANKS AND BANKING**.

Bank Bills, or Notes, promissory notes issued by a bank or banker and representing their face value in specie. In the production of bank notes the principal purpose is to render their forgery impossible, or at least easy of detection. This is sought to be effected by peculiarity of paper, design, and printing. Bank of England notes are printed in one of the blackest and most indelible of inks, on paper expressly made for the purpose by one firm only. It is a hand-made paper, remarkable for strength, lightness, and difficulty of imitation, and its peculiar watermark constitutes one of the chief safeguards against forgery. No Bank of England notes are issued twice, so that this mark is rarely indistinct and the paper does not lose its peculiar crispness. Some years ago a self-registering machine was invented for impressing on each note a distinctive mark known only to the bank authorities. Owing to some of the notes of the Scotch banks, printed simply in black ink, having been successfully forged by photography, those issued by them have since 1858 been printed in colored inks, at least two colors being used for each note.

Since 1855 the notes of the Bank of England have been all produced by surface printing from an electrotpe. The number of notes produced and issued by this bank sometimes amounts to 300,000 per week. There are 70 or 80 kinds of Bank of England notes, differing in their denominations or values, but similar in the mode of printing.

In the United States the bank notes at present in circulation are manufactured by the Government Bureau of Engraving and Printing, the paper being made by a private concern under a patented process, the chief ingredients being a mixture of linen and cotton fibre, into which are introduced threads of silk so arranged as to be perceptible after the notes are printed. This style of paper is furnished only to the government. The highest skill is exercised in engraving the plates, nearly all parts of them being executed by the geometrical lathe and the ruling-machine the work of which it is impossible to imitate successfully by hand. The printing of the notes is done in colored inks of the best quality, sometimes as many as four shades being used. The great expense of the machines used in the engraving, and the superior quality of the work generally, renders successful counterfeiting almost impossible. The notes, when badly worn, are returned to the United States Treasury, and other notes are issued in their stead. See **MONEY, PAPER**.

Bank Holidays, days during which banks are legally closed. In the United States they are: 1 January, or New Year's Day, a legal or bank holiday in all the States except Arkansas, Delaware, Georgia, Kentucky, Maine, Massa-

BANK-SWALLOW — BANKRUPTCY LAWS

chusetts, New Hampshire, Rhode Island, and North and South Carolina. 4 July, Independence Day, and 25 December, Christmas Day, are bank holidays in all the States and Territories of the Union. Thanksgiving Day and public fast days appointed by the President of the United States are also legal, or bank, holidays. 12 February, the anniversary of the birth of Abraham Lincoln, is a legal holiday in nine States. 22 February, the anniversary of the birth of Washington, is a legal holiday in all the States save Arkansas, Iowa, and Mississippi. The first Monday in September, Labor Day, is a holiday in nearly all the States. 8 January, anniversary of the Battle of New Orleans, and Firemen's Day, 4 March, are legal holidays in Louisiana. Good Friday is a legal holiday in Florida, Louisiana, Minnesota, and Pennsylvania; and Shrove Tuesday in Louisiana and Alabama. Decoration Day (North) and Memorial Day (South) is observed in the several States.

In England and Ireland the bank holidays are: (1) Easter Monday; (2) the Monday in Whitsun week, generally called Whit Monday; (3) the first Monday in August; (4) 26 December, popularly called Boxing Day. In Scotland: (1) New Year's Day; (2) the first Monday in May; (3) the first Monday in August; (4) Christmas Day.

When one of these holidays falls on Sunday it is observed on the following day, and a note or check becoming due on a holiday or a Sunday is payable on the first business day following.

Bank-swallow, a small swallow, familiar not only in all parts of America, but in most other countries, for its habit of breeding in colonies in holes in sand-banks. It is sooty black above, and white on the under surface of the body, with a dusky band across the breast. This swallow comes from its winter home in the tropics, among the earliest birds of spring, and spreads northward even to the borders of the Arctic Ocean. Many, however, remain within the United States, where companies of them seek the banks of streams or exposed cliffs of sand, and bore in close proximity a great number of tunnels, which may be seven or eight feet deep. The bill and feet are both exceedingly weak, yet with these feeble tools each pair, working alternately and with great diligence, complete their excavation in a surprisingly short time. The same bank will be occupied year after year. The inner extremity of the tunnel is furnished with a nest of dry grass and feathers, and there are laid in June four or five pure white eggs. The tunnels are used as roosting-places at night by both sexes, and when the young are hatched they will scramble to the mouth of the burrow and may be seen sitting there some days before they obtain strength and courage to launch forth upon their wings. These swallows, like others, feed entirely upon small insects caught in the air, and the sight of a crowd of them dating about the neighborhood of their homes, with a constant twittering, is one of the most familiar and pleasing sights of our country districts. The English sparrows trouble them greatly by seizing upon their burrows and dragging out the furniture; and snakes and mice sometimes enter the holes, but against most ene-

mies these swallows are well protected. Our common species (*Hirundo riparia*) is also numerous throughout Europe and Asia. Very similar species inhabit the Oriental region and Africa. These birds are well described in all standard works of ornithology, and some special information may be obtained in the 'Monograph of the Hirundinidae' by Sharpe and Wyatt, (1885-94); and in 'Bird Watching,' by Edmund Selous (1901). See SWALLOW.

Bank of England. See BANKS AND BANKING.

Bank of France. See BANKS AND BANKING.

Bank of North America. See BANKS AND BANKING.

Banks of the United States. See BANKS AND BANKING; UNITED STATES — FINANCES OF.

Bankrupt, a term derived generally from Italian, *banca*, a bench, and Latin, *ruptus*, broken, in allusion to the benches formerly used by the money-lenders in Italy, which were broken in case of their failure. There is perhaps no branch of legislation more difficult, and at the same time more important, than that which defines the relations of debtors and creditors. One of the first objects of all laws, after the protection of the person, is the enforcement of the obligation of contracts, and among all the contracts made in a community those imposing the obligation to pay money constitute the most numerous class. Some of the first questions in legislation are, By what measures shall this obligation be enforced? and by what penalties shall the breach of it be punished? In many communities, especially in the earlier stages of civilization, the breach of such a contract or obligation is regarded as a crime, and the insolvent debtor is treated as a criminal. The ancient laws upon this subject in England so regard the insolvent trader. The early laws of the Romans and Athenians authorized the most rigorous measures for procuring satisfaction of a debt, even permitting the sale of the debtor into slavery for this purpose. But as civilization advances the laws put a more mild construction upon the debtor's failure to fulfil his contract. See BANKRUPTCY LAWS.

Bankruptcy Laws. When a person is unable to pay his debts in full, the law of civilized countries adopts some means of satisfying the creditors, as far as they can be satisfied, out of the debtor's estate, and relieving the debtor himself from pressure which, by his own efforts, he would not be likely to overcome. The debtor having been declared a bankrupt, his property vests in his creditors for the purpose of being divided ratably among them, and consequently he starts anew, entirely relieved from the obligations thus partially satisfied. In general terms this is the process of bankruptcy as observed in modern societies. The law of bankruptcy is, in fact, a modern creation slowly evolved out of the criminal code in answer to the necessities of a widely spread industrial life. The early law of Rome, while prohibiting contracts of usury, gave the legal creditors the savage remedy of dividing the carcass of their debtor or selling him and his family into slavery. The *Lex Poetelia* (about 326 B.C.) enabled a debtor who could swear to being worth as much as he owed to save his freedom by re-

BANKRUPTCY LAWS

signing his property; and many years afterward the legislation of Julius Cæsar established the *cessio bonorum* as an available remedy for all honest insolvents. The bankrupt law was slowly developed in England. The first English statute on bankruptcy (34 and 35 Henry VIII., c. 4) was directed against fraudulent debtors, and gave power to the lord chancellor and other high officers to seize their estates and divide them among their creditors. In England, before 1841, only a tradesman could be a bankrupt. This distinction was then abolished. It was abolished in the United States in 1869. In the United States, Congress alone has power to pass a bankrupt law which shall have authority throughout the country. The several States may enact such statutes when there is no law of Congress in operation. The first general bankrupt act in the United States was passed in 1800 and was repealed in 1803. In 1841 another law was put in operation, with a special view of meeting the urgent needs of debtors who had been ruined by the commercial revolution of 1837-8, and who could receive no effectual relief from local laws. This act was repealed in 13 months, but in the meantime a large number of cases had been disposed of, amounting to 3,250 in Massachusetts alone. Another bankrupt law was passed which took effect 1 June 1867. It was framed with great care by a committee of the House of Representatives, of which Mr. Jenckes was the chairman and chief working member. Its authors hoped that it would form a permanent addition to the jurisprudence of the country, but it was repealed within a few years.

An act "to establish a uniform system of bankruptcy throughout the United States," was passed by both Houses of the 55th Congress, and by the approval of President McKinley became a law on 1 July 1898. The question had been brought before Congress for several years, the issue not being between the political parties, but on the method of legislation, one side favoring the creditor and the other the debtor class. The Nelson bankruptcy bill, which at the first, or special, session of the 55th Congress, passed the Senate, failed to receive the consent of the House. The new law was a compromise between the Nelson bill, calculated chiefly to benefit debtors, and the Torrey bill, designed to guard the interests of both creditors and debtors. The adoption of the bill which became a law was mainly through the long-continued efforts of Senator Hoar (Rep., Mass.), aided especially by Senator Nelson (Rep., Minn.), and Representative George W. Ray (Rep., N. Y.). A conference between the two Houses was held, which reached an agreement on 15 June, the report being adopted by the House, 28 June, by a vote of 133 to 53; present and not voting, 24. All the votes against the bill came from the South and the far West.

The provisions under which a man can be thrown into bankruptcy against his will are as follows: (1) where a man has disposed of his property with intent to defraud; (2) where he has disposed of his property to one or more creditors to give a preference to them; (3) where he has given a preference through legal proceedings; (4) where a man has made a voluntary assignment for the benefit of his creditors generally; (5) where a man admits in writing that he is a bankrupt. The last two

provisions are practically voluntary proceedings. Under the common law a man is considered insolvent when he cannot pay his debts when they are due; under the new law he is deemed insolvent only when his property, fairly valued, is insufficient to pay his debts. Only two offenses are cited under the new law; one when property is hidden away after proceedings in bankruptcy have been begun, and the other when perjury is discovered. Discharges are to be denied in only two cases; one, in which either of the offenses detailed has been committed, and the other, when it is shown that fraudulent books have been kept. The term of imprisonment for either of these offenses is not to exceed two years.

The law provides a complete system throughout the United States, and for its administration by the United States courts in place of the different systems formerly in existence in the various States administered by State courts. In bankruptcy proceedings a bankrupt debtor may turn over all his property to the court, to be administered for the benefit of his creditors, and then get a complete discharge from his debts. A bankrupt may of his own motion offer to surrender his property to the administration of the United States court and ask for his discharge in voluntary bankruptcy, or creditors may apply to the court to compel a bankrupt to turn over his property to be administered under the act for the benefit of the creditors in involuntary bankruptcy. The bankrupt who has turned over all his property and conformed to the provisions of the acts is entitled to a judgment of court discharging him from any future liability to his creditors.

Extended powers are given by the law for the taking possession and the administration of the assets, among others, to allow and disallow all claims against bankrupt estates; appoint receivers and take the necessary measures for the preservation and charge of the property of a bankrupt; to arraign, try, and punish bankrupts, officers, and other persons, and the agents, officers, and members of the board of directors or trustee, or other similar bodies or corporations for violation of the act; to authorize the business of the bankrupt to be conducted for limited periods; to cause the assets to be collected and reduced to money and distributed, and substantially determine all controversies in relation thereto; to enforce obedience to lawful orders by fine or imprisonment; and to extradite bankrupts from one district to another. As all questions, both of law and fact, in relation to the property of the rights of the various parties, must be decided in the bankruptcy proceeding, it is provided that referees be appointed, who are charged with the duty of hearing the allegations and testimony of all parties, and deciding all such questions as may arise. Each case, as it comes up, is assigned to some referee, whose duty it is to adjudicate and pass upon all such questions arising therein in the first instance, the right being reserved to any parties to appeal from the decision of the referee to the United States district court. The duties of the referee are substantially of a judicial character, and he occupies much the position of a judge of primary resort, subject to an appeal to the court, and is required to take the same oath of office as that prescribed for judges of the United States courts.

BANKS

Provision is made in the act for allowing bankrupts to compromise or settle with their creditors by a proceeding known as composition proceedings, whereby, if a bankrupt and a majority of his creditors agree upon some basis of settlement, the same, if approved by the court, shall become binding upon all creditors. The decision of the question as to the approval of compositions and granting discharges to a bankrupt from his debts is specifically reserved by the act to the judges of the United States courts; but the court, by virtue of its general powers, may refer such matters to the referee to take testimony and report to the court his opinion thereon. The aim of the act has been to make the expense of the proceedings depend largely upon the amount of the property involved, and the compensation of the referee is fixed substantially at one per cent on the amount distributed to the creditors in ordinary cases, where the assets are distributed by the court, and one half of one per cent in composition cases, and the trustees who have charge of the actual management of the bankrupt's property receive as compensation such commissions on accounts paid out by them as dividends as the court may allow, not to exceed, however, three per cent on the first \$5,000, two per cent on the second \$5,000, and one per cent on all sums in excess of \$10,000.

Banks, Mrs. Isabella (VARLEY), English poet and novelist: b. Manchester, England, 25 March 1821; d. London, 5 May 1897. After teaching school for some years in Manchester, she married the journalist, George Linnæus Banks in 1846 and with him published a volume of verse, 'Daisies in the Grass' (1865). Her first novel, 'God's Providence House' (1865), made her widely known, and among other popular novels by her are: 'Stung to the Quick' (1867); 'The Manchester Man' (1872); 'Wooers and Winners' (1880); 'Forbidden to Wed' (1883); 'In His Own Hand' (1885); 'Geoffrey Oliphant's Folly' (1886). She published several volumes of poems also and she and her husband were the authors of many popular songs.

Banks, Sir Joseph, English naturalist: b. London, 4 Jan. 1743; d. Islesworth, 19 June 1820. While in Oxford he began to manifest a strong love of botany and other branches of natural history, to which his attention had already been turned from about the age of 14. He formed a volunteer class in the university and brought Mr. Lyons from Cambridge to teach it. In May 1766 he was chosen a member of the Royal Society, and in the following summer he went to Newfoundland and proceeded to Hudson Bay to collect plants. In 1768 he, with Dr. Solander, a pupil of Linnæus and assistant librarian at the British Museum, accompanied Cook on his voyage of discovery, Banks being appointed naturalist to the expedition. In an expedition into the interior of the desolate Tierra del Fuego, for the purpose of examining the country, the two naturalists narrowly escaped perishing with cold. Banks procured the introduction of the bread-fruit tree into the West Indies, and he wrote the botanical observations in the account of Cook's voyages. In 1772 he visited Iceland with Dr. Solander, in order to make himself acquainted with its natural productions. During this voyage the

Hebrides were examined, and the columnar stratification of the rocks surrounding the caves of Staffa was made known to naturalists for the first time. After the resignation of Sir John Pringle in 1777 Banks was chosen president of the Royal Society. In 1781 he was made a baronet. The French chose him a member of the National Institute in 1802, because to his intercession they owed the recovery of the papers of La Peyrouse relating to his voyage, which had fallen into the hands of the British. His library and his collections in natural history are celebrated. Besides some essays, periodical publications, and some contributions to the transactions of learned societies, he wrote nothing but 'A Short Account of the Causes of the Blight, the Mildew, and the Rust in Corn' (1805). In accordance with a contingent bequest his collections were added to the British Museum. The genus *Banksia*, of the natural order *Proteaceæ*, was named in honor of him by the younger Linnæus.

Banks, Nathaniel Prentiss, American soldier and statesman: b. Waltham, Mass., 30 Jan. 1816; d. there 1 Sept. 1894. Entirely self-taught, he worked himself up from the position of bobbin-boy in a cotton factory to the editorship of a weekly newspaper. He read law, was admitted to the bar, and began to practise, but soon became active in politics. Elected to the Massachusetts legislature in 1849, he became speaker in 1851-2. In 1853 he was president of the Massachusetts Constitutional Convention, and the same year was elected to Congress as a Coalition Democrat. The session which began 3 Dec. 1855, was memorable for its bitter speakership contest, the candidates being Banks and William Aiken, a large slaveholder of South Carolina. The contest lasted two months, the President's message being withheld, and all legislative business blocked. The sergeant-at-arms borrowed \$20,000 from a Philadelphia bank in order to make advances to needy members of both parties. On the 133d ballot, 2 Feb. 1856, Mr. Banks was elected. None of his decisions while speaker were ever reversed by the House. He was governor of Massachusetts, 1857-9. In 1861 President Lincoln appointed him major-general of volunteers. He conducted active operations in the Shenandoah valley and fought with credit at Winchester and Cedar Mountain. In co-operation with Admirals Farragut and Porter he invested Port Hudson and unsuccessfully attempted to carry it by assault. In 1864, much against his judgment, he was placed in command of the Red River Expedition, which resulted most disastrously for the Federal forces. Banks was widely censured and soon relieved of his command. Gen. Grant, years later, in his 'Memoirs' furnished a full vindication of Banks by giving the name of the superior officer responsible for the expedition. From 1866 to 1876 Gen. Banks represented his old district in Congress, and was prominent as chairman of the Committee on Foreign Relations. He was United States marshal for Massachusetts, 1879-88. In 1891 Congress bestowed on him an annual pension of \$1,200, a severe mental disorder having come upon him.

Banks, Thomas, English sculptor: b. Lambeth, 29 Dec. 1735; d. 2 Feb. 1805. He studied sculpture in the Royal Academy, and was sent,

BANKS — BANKS AND BANKING

as one of its students, to Italy. Here he executed several excellent pieces, particularly a bas-relief representing Caractacus and his family before Claudius, and a Cupid catching a butterfly. Among other works executed by him was a colossal statue showing Achilles enraged for the loss of Briseis, now in the entrance hall of the Royal Academy. He was also the sculptor of the admired monument of Sir Eyre Coote in Westminster Abbey, and of those of Dr. Watts and Woollett. He was elected a member of the Royal Academy in 1785.

Banks, a nautical term applied to shelving elevations in the sea or the bed of a river, rising to or near the surface, composed of sand, mud, or gravel. When tolerably smooth at the top they constitute shallows, shoals, and flats; but when rocky become reefs, ridges, keys, etc. A good chart always defines them, indicating whether they are sands or rocky.

Banks Land, an island in the Arctic Ocean, discovered by Parry in 1819, explored by McClure in 1850, and named by him Baring Island. It is separated by Banks Strait from Melville Island, lying to the northwest, and by Prince of Wales Strait from Prince Albert Land, lying eastward.

Banks and Banking. In specific relation to his customer the banker occupies the position of debtor to creditor, holding money which the customer may demand at any time in whole or in part by means of a check payable at sight on presentation during banking hours. For the refusal to cash a check from the erroneous supposition that he has no funds of his customer's in his hands, or for misleading statements respecting the position in which the bank stands, the banker is legally responsible. Moreover, the law regards him as bound to know his customer's signature, and the loss falls upon him in event of his cashing a forged check. In their relations to the community, the chief services rendered by banks are the following: By receiving deposits of money, and massing in sums efficient for extensive enterprises the smaller savings of individuals, they are the means of keeping fully and constantly employed a large portion of the capital of the community which, but for their agency, would be unproductive; they are the means by which the surplus capital of one part of a country is transferred to another; where it may be advantageously employed in stimulating industry; they enable vast and numerous money transactions to be carried on without the intervention of coin or notes at all, thus obviating trouble, risk and expense. The mechanism by which the last of these benefits is secured is to be found in perfection in the clearing-house system.

History.—Although banking operations on a considerable scale appear to have been conducted by the ancients, modern banking must be regarded as having had an independent origin in the reviving civilization of the Middle Ages. In the 12th century almost the whole trade of Europe was in the hands of the Italian cities, and in these the need of bankers was first felt. The earliest public bank, that of Venice, established in 1171, and existing down to the dissolution of the republic in 1797,

was for some time a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a public loan. In the early periods of the operations of this bank deposits could not be withdrawn, but the depositor had a credit at the bank to the amount deposited, this credit being transferable to another person in place of money payment. Subsequently deposits were allowed to be withdrawn, the original system proving inconvenient outside the Venetian boundaries. It was, however, less from the Bank of Venice than from the Florentine bankers of the 13th and 14th centuries that modern banking especially dates, the magnitude of their operations being indicated by the fact that between 1430 and 1433, 76 bankers of Florence issued on loan nearly 5,000,000 gold florins. The Bank of St. George at Genoa also furnished a striking chapter in financial history. The important Bank of Amsterdam, taken by Adam Smith as a type of the older banks, was established in 1609, and owed its origin to the fluctuation and uncertainty induced by the clipped and worn currency. The object of the institution (established under guarantee of the city) was to give a certain and unquestionable value to a bill on Amsterdam; and for this purpose the various coins were received in deposit at the bank at their real value in standard coin, less a small charge for recoinage and expense of management. For the amount deposited a credit was opened on the books of the bank, by the transfer of which payments could be made, this so-called bank money being of uniform value as representing money at the mint standard. It bore, therefore, an *agio* or premium above the worn coin currency, and it was legally compulsory to make all payments of 600 guilders and upward in bank money. The deposits were supposed to remain in the coffers of the bank, but were secretly traded with in the 18th century till the collapse of the bank in 1790. Banks of similar character were established at Nuremberg and other towns, the most important being the Bank of Hamburg, founded in 1619. In England there was no corresponding institution, the London merchants being in the habit of lodging their money at the Mint in the Tower, until Charles I. appropriated the whole of it (£200,000) in 1640. Thenceforth they lodged it with the goldsmiths, who began to do banking business in a small way, encouraging deposits by allowing interest (4d. a day) for their use, lending money for short periods, discounting bills, etc. The bank-note was first invented and issued in 1690 by the Bank of Sweden, founded by Palmstruck in 1688, and one of the most successful of banking establishments. About the same time the banks of England and Scotland began to take shape, opening up a new era in the financing of commerce and industry.

Bank of England.—The Bank of England, the most important banking establishment in the world, was projected by William Paterson, afterward the promoter of the disastrous Darien scheme. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 toward carrying

BANKS AND BANKING

on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation denominated the Governor and Company of the Bank of England. The company thus formed advanced to the government £1,200,000 at an interest of 8 per cent—the government making an additional bonus or allowance to the bank of £4,000 annually for the management of this loan (which, in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital has been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000, in 1816, since which no further augmentation has taken place. There exists besides, however, a variable "rest" of over £3,000,000. The charter of the bank was originally granted for 11 years certain, or till a year's notice after 1 Aug. 1705. It was subsequently renewed for various periods in 1697, 1708, 1713, 1742, 1764, 1781, 1800, 1833, and 1844, certain conditions which the bank had to fulfill being specified at each renewal. On this last occasion it was continued till 12 months' notice from 1855. At the same time the issue department of the bank was established as distinct from the general banking department, the sole business entrusted to the former being the issue of notes. By this arrangement the bank was authorized to issue notes to the value of £14,000,000 upon securities especially set apart, the most important of the securities being the sum of £11,015,100 due to the bank by the government, together with so much of the coin and bullion then held by the bank as was not required by the banking department. The bank has since been permitted to increase its issue on securities to £15,750,000, but for every note that the issue department may issue beyond the total sum of £15,750,000 an equivalent amount of coin or bullion must be paid into the coffers of the bank. The Bank of England notes are, therefore, really equivalent to, and at any time convertible into, gold, as it is in the utmost degree improbable that any drain on the treasure in the bank will reduce the outstanding notes below £15,750,000. They are (like all English bank-notes) of the value of £5 and upward, and are legal tender throughout England. Notes once issued by the bank and returned to it are not reissued but destroyed—a system adopted in order to facilitate the keeping of an account of the numbers of the notes in circulation, and so prevent forgery.

In compliance also with the act of 1844 the bank is compelled to publish a weekly account. The following shows the condition of the bank on 21 Jan. 1903: Issue department: notes issued, £49,666,245; securities, £18,175,000; gold, coin, and bullion, £31,491,245. Banking department: capital and "rest," £18,703,048; deposits and post bills, £50,670,747; securities, £45,438,969; notes in the reserve, £21,314,325; and gold and silver coin, £2,020,501.

The total of the notes given out by the issue department is called the issue circulation, the portion of it in the hands of the public being the active circulation, and that still in the banking department being the note reserve.

This note reserve represents really the amount of bullion in the issue department available for the use of the banking department. Of the other items in the account it may be noted that the proprietors' "rest" is a varying surplus increased always by accumulated profits up to 5 April and 10 October, when the bank dividends are paid to the shareholders; and that the public deposits, which include sums lodged on account of the customs, inland revenue, etc., increase through revenue receipts until the dividend terms in January, April, July, and October. The other or private deposits comprise those of bankers, merchants, and other persons. An increase in these private deposits indicates an increase of monetary ease, while a decrease informs us that bankers, merchants, and traders have calls upon them for money. A better indication of the demand for money is furnished, however, by the advances on commercial securities, and it is by this and the condition of the reserve that the bank rate of discount is regulated. When the reserve is high and the advances moderate the discount rate is low, and it is raised according as the reserve falls and advances are more in request, especially during an adverse foreign exchange and drain of gold. Gold is thus restrained from going abroad, and its influx into the country is encouraged. In addition to the profits which the bank may make by ordinary banking business, it receives an allowance for the management of the national debt, etc., at the rate of £300 per million on £6,000,000, and £150 per million on all debt above that sum. It also derives a profit from the foreign coin and bullion brought to it, for which it pays £3 17s. 9d., or 1½d. per ounce less than the real value.

The management of the bank is in the hands of a governor, deputy-governor and 24 directors, elected by stockholders who have held £500 of stock for six months previous to the election. A director is required to hold £2,000, a deputy-governor £3,000, and a governor £4,000 of the stock. The court or board of directors meets every Thursday, when the weekly account is presented.

Bank of France.—The Bank of France is second in importance only to the Bank of England. It was established in 1800, at first with a capital of 45,000,000 francs, and with the exclusive privilege in Paris of issuing notes payable to bearer, a privilege which was extended in 1848 to cover the whole of France. It has numerous branches in the larger towns, a number of these having been acquired in 1848, when certain joint-stock banks of issue were by government decree incorporated with the Bank of France, the capital of which was then increased to 91,250,000 francs, in 91,250 shares of 1,000 francs each. In 1857 the capital was doubled, and, besides this, it has a large surplus capital or "rest." Like the Bank of England, it is a bank of deposit, discount, and circulation, and is a large creditor of the state. The government appoints the governor and two deputy governors, who are all required to be stockholders. There is also a body of 15 directors and 3 censors, nominated by the shareholders.

The capital stock of the Bank of France is 182,500,000 francs. As shown by statement of resources and liabilities dated 22 Jan. 1903 the surplus and other profits of the bank amounted to 42,515,000 francs, and its outstanding circula-

BANKS AND BANKING

tion to 4,431,801,910. The total assets of the bank were 5,202,090,592, of which 3,601,126,067 consisted of specie divided as follows: Gold, 2,508,805,839; silver, 1,092,320,228.

National Banks of the United States.—The table below, compiled from the report of the comptroller of the currency (2 Dec. 1901), gives a comprehensive view of the development of the national banking system in recent years.

On 25 Nov. 1902, 4,666 national banking associations filed reports of condition with the comptroller of the currency. The paid-in capital stock of reporting banks was \$714,616,353; surplus fund and other undivided profits, \$335,763,730, and \$181,723,772, respectively. The outstanding circulating notes of the reporting banks amounted to \$336,505,993, and their individual deposits to \$3,152,878,796. The aggregate resources of the associations were \$6,104,091,916, an increase since 10 Dec. 1901 of \$381,361,280. Against deposit liabilities of \$3,705,217,132 a reserve was held aggregating \$817,981,481, or 22.08 per cent. The exchanges of the clearing houses of the United States for the year ended 30 Sept. 1902 amounted to \$116,021,618,003, a net increase over the year ended 30 Sept. 1901 of \$1,201,825,917. See BANKS AND BANKING, AMERICAN.

Recent Rapid Growth.—From 14 March 1900 to 31 March 1903—3 years and 17 days—1,442 new banks were organized. They were capitalized and geographically distributed as follows:

STATE	No.	Capital	Bonds Deposited
Alabama.....	16	\$777,500	\$205,000
Arizona.....	6	205,000	51,500
Arkansas.....	5	200,000	50,250
California.....	19	4,205,000	549,000
Colorado.....	20	1,065,000	286,750
Connecticut.....	3	100,000	35,500
Delaware.....	2	50,000	25,000
Florida.....	6	410,000	117,500
Georgia.....	22	1,365,000	319,250
Hawaii.....	2	525,000	56,500
Idaho.....	9	250,000	62,550
Illinois.....	80	5,710,000	1,544,050
Indiana.....	49	3,303,000	839,300
Indian Territory.....	64	1,970,000	524,400
Iowa.....	73	2,445,000	807,250

STATE	No.	Capital	Bonds Deposited
Kansas.....	38	1,490,000	479,750
Kentucky.....	24	2,620,000	498,300
Louisiana.....	12	875,000	194,000
Maine.....	5	250,000	69,500
Maryland.....	20	1,107,000	286,450
Massachusetts.....	5	2,150,000	175,000
Michigan.....	12	2,565,000	242,300
Minnesota.....	95	3,406,000	988,900
Mississippi.....	8	725,000	235,000
Missouri.....	18	1,855,000	385,250
Montana.....	3	305,000	64,000
Nebraska.....	35	960,000	295,800
New Hampshire.....	3	225,000	60,000
New Jersey.....	23	1,070,000	299,800
New Mexico.....	8	225,000	67,550
New York.....	55	6,570,000	1,205,300
North Carolina.....	12	330,000	106,250
North Dakota.....	43	1,105,000	367,500
Ohio.....	85	5,945,000	1,573,450
Oklahoma.....	69	2,065,000	644,300
Oregon.....	7	175,000	51,750
Pennsylvania.....	169	14,407,000	2,830,350
Porto Rico.....	1	100,000	50,000
Rhode Island.....	1	500,000	50,000
South Carolina.....	5	260,000	70,750
South Dakota.....	30	800,000	242,300
Tennessee.....	13	480,000	139,500
Texas.....	166	6,318,000	1,778,450
Utah.....	3	105,000	30,000
Vermont.....	1	25,000	25,000
Virginia.....	26	1,130,000	343,000
Washington.....	7	380,000	101,250
West Virginia.....	31	1,335,000	420,000
Wisconsin.....	28	1,795,000	462,200
Wyoming.....	5	175,000	68,750

Number of new banks..... 1,442
Capital..... \$86,135,500
Bonds deposited..... 20,375,500

Nine hundred and fifty seven of these took advantage of the law of 14 March 1900, permitting the establishment of \$25,000 banks. The remaining 485 were banks of \$50,000 and over capital. These figures include 622 converted State and private banks. During March 1903, 56 banks were organized (more than two for each working day), distributed as follows:

Middle States..... 22 banks, \$700,000 capital
Western States..... 13 banks, 405,000 capital
Southern States..... 12 banks, 640,000 capital
Eastern States..... 8 banks, 400,000 capital
Pacific Territories... 1 bank, 25,000 capital

Number of new banks in one month..... 56
Capital..... \$2,170,000

THE NATIONAL BANKS OF THE UNITED STATES.

Year Ending Sept. 1	No. of Banks	Capital	Surplus	Total Dividends	Total Net Earnings	Ratio of Dividends to Capital	Ratio of Dividends to Capital and Surplus	Ratio of Earnings to Capital and Surplus
1882.....	2,197	473,974,715	133,570,931.00	40,791,928.00	53,321,234.00	8.73	6.81	8.88
1883.....	2,350	494,640,140	131,232,187.00	40,678,678.00	54,007,148.00	8.30	6.50	8.00
1884.....	2,582	518,605,725	147,721,475.00	41,254,473.00	52,362,783.00	8.00	6.20	8.00
1885.....	2,665	524,599,602	146,903,495.00	40,656,121.00	43,625,497.00	7.80	6.00	6.50
1886.....	2,784	532,459,921	155,030,884.00	42,412,803.00	55,165,385.00	7.96	6.17	8.02
1887.....	3,049	578,462,765	173,913,440.97	44,152,407.92	64,506,860.66	7.98	6.12	8.95
1888.....	3,093	583,539,145	184,416,990.92	46,531,657.89	65,360,486.73	8.02	6.10	8.57
1889.....	3,170	596,302,518	194,818,192.19	46,618,060.27	69,618,265.07	7.82	5.89	8.80
1890.....	3,353	625,089,645	208,707,786.00	51,158,883.33	72,055,563.52	8.19	6.14	8.65
1891.....	3,577	660,108,261	222,766,668.00	50,795,011.00	75,763,614.00	7.70	5.76	8.60
1892.....	3,701	679,076,650	237,761,865.23	50,400,713.93	66,658,015.27	7.42	5.50	7.27
1893.....	3,759	684,342,024	246,918,673.11	49,633,195.99	68,750,952.09	7.25	5.33	7.38
1894.....	3,755	672,951,450	246,001,328.00	45,333,270.00	41,955,248.00	6.07	4.09	4.05
1895.....	3,716	660,287,065	247,466,002.00	45,969,663.00	46,866,557.00	6.96	5.06	5.15
1896.....	3,682	652,725,750	248,235,323.00	45,525,947.00	49,742,318.00	6.97	5.05	5.52
1897.....	3,620	638,173,895	249,044,948.00	42,394,241.00	44,273,314.00	6.64	4.78	4.99
1898.....	3,581	615,818,725	244,281,879.00	44,291,971.00	50,032,972.00	7.17	5.15	5.82
1899.....	3,561	608,674,895	247,930,970.00	46,691,502.00	54,346,692.00	7.67	5.45	6.34
1900.....	3,632	613,053,695	250,914,856.00	47,995,024.00	87,293,485.00	7.89	5.57	10.14
1901.....	4,032	639,042,080	271,432,304.00	52,616,778.00	81,853,795.00	8.28	5.82	9.06
1902.....	4,269	673,763,767	302,513,154.00	68,199,494.00	106,581,477.00	10.12	6.99	10.92

BANKS AND BANKING

The number of new banks in the manufacturing States is very marked. Ohio, 85; Indiana, 49; Illinois, 80; Pennsylvania, 169; New York, 55. The agricultural States also show up well, with 166 for Texas, 95 for Minnesota, 69 for Oklahoma, and 64 for Indian Territory.

By groups of States the showing is:

	No.	Capital	Bonds Deposited
New England States	18	\$ 3,250,000	\$ 415,500
Eastern States.....	269	23,204,000	4,646,900
Southern States.....	346	16,825,500	4,477,250
Middle States.....	440	26,751,000	6,842,700
Western States.....	315	10,160,000	3,041,100
Pacific States.....	51	5,320,000	846,050
Islands.....	3	625,000	106,500

The \$20,375,500 of bonds deposited against circulation is a fraction less than 24 per cent of the capital, the latter being the measure of the maximum amount of circulation issuable. Our total national bank figures for 31 March 1903, were:

		Increase since 14 March, 1900
Number of banks....	4,869	1,252
Capital.....	\$739,178,695	\$122,870,600
Bonds on deposit....	342,160,770	97,549,200
Circulation secured by bonds.....	338,349,814	
Circulation secured by lawful money..	44,169,444	128,116,528

UNITED STATES CURRENCY CIRCULATION.

FISCAL YEAR	Amount in circulation	Circulation per capita
1870.....	675,212,794	17 50
1872.....	738,309,549	18 19
1873.....	751,881,809	18 04
1874.....	776,083,031	18 13
1875.....	754,101,947	18 16
1876.....	727,609,338	16 12
1877.....	722,314,883	15 58
1878.....	729,132,634	15 32
1879.....	818,631,793	16 75
1880.....	973,382,228	19 41
1881.....	1,114,238,419	21 70
1882.....	1,174,290,419	22 37
1883.....	1,230,305,696	22 90
1884.....	1,243,925,969	22 65
1885.....	1,292,568,615	23 02
1886.....	1,252,700,525	21 82
1887.....	1,317,539,143	22 45
1888.....	1,372,170,870	22 88
1889.....	1,380,361,649	22 52
1890.....	1,429,251,270	22 82
1891.....	1,497,440,707	23 41
1892.....	1,601,347,187	24 44
1893.....	1,596,701,245	23 85
1894.....	1,660,808,708	24 28
1895.....	1,601,968,473	22 93
1896.....	1,506,631,026	21 10
1897.....	1,640,808,946	22 49
1898.....	1,837,859,805	24 66
1899.....	1,904,071,881	25 45
1900.....	2,055,150,998	26 94
1901.....	2,175,387,277	27 98
1902.....	2,249,390,551	28 43

Currency Act of 1900.—On 14 March 1900 President McKinley approved a new currency act, which, among other things, established the gold dollar as the standard unit of value, and placed at a parity with that standard all forms of money issued or coined by the United States. The bill also made a number of important changes in the regulations governing national banks. The new law permits national banks with \$25,000 capital to be organized in places of 3,000 inhabitants or less, whereas the mini-

mum capital previously was \$50,000. It also permits banks to issue circulation on all classes of bonds deposited up to the par value of the bonds, instead of 90 per cent of their face, as before. This act also reduced the semi-annual duty on national bank circulation secured by 2 per cent consols of 1930 to one fourth of 1 per cent. As a result of this legislation the outstanding circulation of national banks increased over \$100,000,000 between the date of passage of the act and 31 Oct. 1901.

From 14 March 1900 to the close of the calendar year ended 31 Dec. 1902, there were organized 1,302 national banking associations with authorized capital stock of \$78,025,500, and with bonds as security for circulation of \$18,589,700. Included in the total number of organizations were 863 banks with capital \$22,570,500, with individual capital of less than \$50,000, or practically \$25,000. The number of banking institutions in the country, by reason of these organizations, was only increased to the number of 744, as 161 of the associations were conversions of State banks, and 397 reorganizations of State or private banks liquidated for the purpose. During the existence of the national banking system, terminating with the calendar year 1902, there were organized 6,566 national banking associations, of which number 1,421 were placed in voluntary liquidation by stockholders and 389 in charge of receivers, leaving in active operation 4,756 with capital stock of \$723,416,695. These associations had on deposit with the treasurer of the United States in trust, as security for circulation, bonds to the amount of \$344,252,120 on which circulation had been issued (on that date) to the amount of \$342,127,844. In addition to circulation secured by bonds there were outstanding notes to the amount of \$42,801,940 secured by deposits of lawful money. The increase of national bank circulation from 14 March 1900 to 31 Dec. 1902 was in round numbers \$130,500,000. On 12 April 1902 the act was approved authorizing the extension, for a further period of 20 years, of the charter of national banking associations which had been extended under the act of 12 July 1882. From the date of the passage of the extension act of 1902 to 25 Feb. 1903, the corporate existence of 258 associations were extended for a second time. This, it was calculated, would make an immediate increase in national bank circulation of \$24,000,000, as the amount of bonds then deposited to secure circulation was about \$242,000,000. See UNITED STATES—FINANCES OF THE.

O. P. AUSTIN,

United States Treasury Department.

Banks and Banking, American. Banks and banking, taken of themselves, constitute a chapter of first importance in American records. To the national life the banking system is as the arterial system is to animal life. Through it circulates the vitalizing current which sustains the brain of business and statecraft, and strengthens the arm of labor. It facilitates all commercial transactions, and utilizes all the resources of trade, gathering together the surplus capital of the country, each depositor affording comparatively little, but collectively producing a sum immense in quantity, which can be loaned in portions to those who may need it. No part of the uninvested capital then remains unused; what is not required by one can be used by another.

BANKS AND BANKING

In this country the existence of banks dates from the time of the Revolutionary War. Since then the methods pursued to attain the ends proper to the banking function have been frequently and often radically changed. They have always been, however, more or less sound, considered with regard to their adaptation to the times they served and the needs they had to supply. In the history of their variations, therefore, we must see the effect of changed conditions, rather than assume the downfall of early error. One century ago the fiscal affairs of America rested in the hands of a great national bank, the Bank of the United States. The institution was modeled almost exactly upon the plan of the Bank of England, then, as now, one of the greatest financial factors in the world. For 40 years, with a brief lapse of between 4 and 5 years, just before and during the War of 1812, this institution continued to be the dominant power in the financial affairs of America. Its passing away was marked by one of the bitterest political fights known to history, waged by that doughty old partisan, Andrew Jackson, and his successor, Martin Van Buren. The next quarter of a century saw the so-called State-bank system in full control. Many of these State banks were, undoubtedly, as sound and solvent as any of the great institutions to-day. Others, it is equally true to say, were not, and the conditions of affairs which resulted from their operation, as a whole, can scarcely be said to have been of the best. With no uniform basis for their government, the prosperity of the time had constantly to struggle under the disadvantage of a demoralized currency, discounted in direct proportion to the number of miles it traveled from home.

The Civil War, with its terrible demands upon the country, found this system unable to respond as fully as was needed, and a new system, the one under which we have remained until to-day, was devised. It avoids the centralization of power in any one great chartered institution, and distributes it at large among the banks of the country. It places the pledge of our government behind every bank-note issued in the United States. Around this national system has grown up the financial world of to-day. Among these facilities are banks of discount and deposit, which furnish their conveniences to the mercantile world; great private houses, with branches reaching to every other country, and furnishing a medium of foreign exchange which renders possible the extended commercial enterprises which now characterize America; and savings institutions, trust companies, and financial engines without number, all furnishing the power to drive the great business machines of to-day.

The beginning of American banking is so indissolubly linked with the name and fame of Alexander Hamilton, first secretary of the Treasury of the United States, that many have forgotten the fact that Robert Morris, the Philadelphia merchant, was the first great American banker. He it was, who, in company with George Clymer and a few other gentlemen, taking as their sole security bills drawn in desperation by the Continental Congress on John Jay, then in Spain negotiating a loan, established on their own personal credit in 1780 the Pennsylvania Bank, in Carpenters' Hall, Philadelphia. This was the first bank established in the United

States. Its only object was to aid, with all its resources, the government in transporting and maintaining the army, then in the most desperate need. This patriotic end it accomplished, and to its aid, given at a most critical time in the national history, it is scarcely possible to ascribe too great an importance. Robert Morris having been appointed superintendent of finance, the Bank of Pennsylvania went out of existence in the following year, and Congress, acting by Mr. Morris' advice, granted in December to him and his associates a charter for the Bank of North America, and in January 1781 the new bank began business in Philadelphia. Thomas Willing was its first president, and there were 12 directors. While this bank was, like its predecessor, designed to give aid to the government, then in those desperate financial straits which marked the closing years of the War, it was also intended to furnish its facilities to individuals and to carry on a general banking business. Its capital was \$400,000, and it was conducted on a specie basis, its notes being declared legal tender. It also secured a charter from the State of Pennsylvania, and as it was the only bank in the country at that time, it soon began to roll up large profits. The years 1783 and 1784 saw this prosperous institution declaring dividends of 14 per cent. Such success immediately produced emulators, and a corporation was formed to start a rival bank. Before its charter had been secured, however, its leading projectors were pacified by being allowed to obtain large blocks of a new issue of \$500,000 worth of stock. This preserved its field undivided, and its prosperity continued. In 1787 it was rechartered by the Pennsylvania legislature as a State bank, and with renewals from time to time, has since continued.

New York, having seen the success of the Bank of Pennsylvania, and her merchants appreciating the facilities afforded by such an institution, began agitating the question of the establishment of a bank in their city. A number of prominent men assembled, and a plan was proposed which was at once called by its opponents the "land" bank. It provided for paying in but a small proportion of the capital in specie, the balance to be secured by land accepted at two thirds of its appraised value, and against which notes, payable in specie, could be issued for one third of its value. Of this plan Chancellor Livingston was the great supporter, and his influence had nearly carried it through the legislature when it applied to be chartered. Its adversaries, prominent among whom was Alexander Hamilton, managed to defeat its passage, however, and it was never revived. Much more serious was the experience of a modified form of "land" bank which convulsed the colony of Massachusetts a number of years before, and was finally established after the deposition of an opposing governor. In a short time, however, the British government dissolved it, and placed some severe restrictions upon banks in that particular colony. The demand for a bank continued to be made by the New York merchants, and on 23 Feb. 1784 a call was issued for a meeting, which was held at the Merchants' Coffee House and Gen. Alexander MacDougal occupied the chair. It was then decided to start a bank with a capital of \$500,000, either gold or silver, divided into 1,000 shares. On 15 March, 500 shares having been taken, the stockholders organized by the election of Gen. MacDougal as president,

BANKS AND BANKING

and Samuel Franklin, Robert Bowne, Comfort Sands, Alexander Hamilton, Joshua Waddington, Thomas Randall, William Maxwell, Nicholas Low, Daniel McCormick, Isaac Roosevelt, John Vanderbilt, and Thomas B. Stoughton, as directors. William Seton was elected cashier, and so unused were New York business men of that day to banks and banking methods that Cashier Seton was immediately sent to Philadelphia, with letters of introduction to the Bank of North America, to learn how such affairs were properly conducted. The stockholders, in the interim, urged on by the hopes of large profits, hastened all their arrangements, and as a charter had not been secured from the legislature, the bank started without one, opening its doors 9 June 1784. This bank, known as the Bank of New York, had for its original location the old mansion of William Walton, at No 67 St George's (now Franklin) Square. Three stories high and built of the old yellow Holland brick with hewn stone lintels, this ancient house, erected in 1752, remained standing until 1881.

But even at this early day it appears there were many people who believed that banks were antagonistic to the interests of the community, and in 1785 and 1786, currency becoming scarce, a cry went up that these institutions were hoarding specie, and in some States, notably New York, where the feeling was greatest, issues of paper money were put out by the legislatures. Financial affairs were in this condition, general confidence being shaken, when, the Constitution having been adopted and Gen. George Washington elected to the presidency, Alexander Hamilton, the first secretary of the treasury, came forward with his famous financial policy. The nation assumed and bonded the debt incurred by the Continental Congress and the various colonies in carrying on the War, and, going further, established in 1791 the Bank of the United States. This bank, which was chartered by Congress for 20 years, was established to act as the fiscal agent of the government and to be the depository for the public moneys. It was also authorized to issue its notes, payable in specie, and was made in every way possible the agent of the United States Treasury and the great power in the financial affairs of the country. Its capital was placed at \$10,000,000, divided into 25,000 shares of \$400 each, payable one fourth in specie and three fourths in 6 per cent stocks of the United States. It was allowed to hold property of all kinds up to the value of \$15,000,000, inclusive of its capital stock, and further to establish branch banks in the various cities. In accordance with this last provision it at once opened in New York a branch known as an office of discount and deposit. The prosperity of the Bank of the United States began at once, and during its whole career it averaged annual dividends of 8 and 10 per cent.

The influence of Hamilton's policy was immediately felt, and prosperity speedily returned. The spirit of speculation was let loose in the land and a stringency resulted in the currency that seemed likely to have serious consequences, and was only averted by Alexander Hamilton and the United States Treasury coming three times to the relief of the straitened business community. After this little set-back, which was of short duration, business continued steadily to improve. In New York, where political influence had prevented the granting of charters

for new banks, a corporation known as the Manhattan Company, and headed by Aaron Burr, succeeded in 1799 in getting a charter, ostensibly to provide New York with pure water. The capital of the company was placed at \$2,000,000, and, unnoticed by the politicians in power, the charter contained a clause which, after reciting that the capital was to be devoted to establishing a water-supply, declared that the surplus should be "employed in the purchase of public or other stocks or other moneyed transactions or operations not inconsistent with the laws and constitution of the State of New York." It is needless to say that with such a clause in its charter \$500,000 was quickly found, and the money, after fulfilling the object for which the charter was granted, was devoted to the establishment of a new bank. In 1803 no less than 40 banks were open and doing business throughout the country.

The expiration in 1811 of the charter of the Bank of the United States, which had failed of renewal, followed by the war declared in 1812 against England, placed the country in a most unsatisfactory position. Having little or no credit, it found itself forced to fall back in great measure on the banks. These were all institutions under State charters, no less than 123 new ones having been created in the four years following the closing of the United States Bank. These had an aggregate capital of \$40,000,000 and emitted notes to the face value of \$200,000,000, a large portion of which, in the Middle States especially, were issued as loans to the government. As might, perhaps, have been expected in view of the prostration of the public credit, the strain upon the banks speedily became too great, and 1 Sept 1814 specie payment was suspended. It was during this period that the private banker first assumed the importance in the commercial world that he has to-day. Stephen Girard, the great Philadelphia merchant, purchased in 1811 the building and stock of the late Bank of the United States, and then began carrying on a banking business himself, with a capital of \$1,200,000, which he shortly increased to \$4,000,000. While private banks had, of course, existed, there had been none in America on such a grand scale, and it marks the beginning of the era of great houses whose names are associated with money the world over. Girard's patriotism was, too, quite equal to his sagacity, and in the closing years of the war, after the Treasury had vainly tried to float a loan of \$5,000,000, but had only been able to secure a total subscription of \$20,000, Girard took the whole amount. The assistance thus furnished undoubtedly had its effect in bringing about the successful peace. This was accomplished in December 1814, and one of the acts of Congress soon after was to grant a new charter for 20 years to the Bank of the United States. This institution accordingly resumed business in January 1817 and speedily became one of the greatest financial institutions in the world. Its capital was fixed at \$35,000,000, divided into 350,000 shares. Of this, \$7,000,000 was held by the United States. Of the remainder, a great amount, as much as 84,000 shares at one time, was held in foreign countries, and the stock was quoted at 50 per cent above par. This bank issued notes, none being less than \$5 00, payable in specie on demand, and did a general banking business, discounting notes and making advances

BANKS AND BANKING

on bullion at the rate of 6 per cent. Its government was intrusted to 25 directors, 5 of whom, being holders of stock, were appointed by the President of the United States. From these directors was chosen a board of 7 which, headed by the president, had active control of all its operations. It rapidly established branch offices in all the cities of any importance, and in 1830 there were 27 of these branch banks in existence and doing a thriving business. One of the first effects of the rechartering of the Bank of the United States was to force the large number of State banks to resume specie payments or to wind up their affairs. Many were forced to the latter alternative, and of the 446 State banks then existing, there were 165, including those ruined by the war, which went out of business. From the aggregate State banking capital of \$90,000,000, in the whole country, these suspensions withdrew \$30,000,000. Of this amount, \$5,000,000 was an actual loss and was distributed between the government and individual holders. For some time after this the State banks can scarcely be said to have increased, although they continued in existence and legislative provision for them and their government was made in many of the States.

In New York a general banking law, known as the Safety Fund Act, was passed in April 1829. Under it banks were allowed to issue circulating notes up to twice the amount of their capital, and their loans were limited to two and a half times their capital. A guarantee fund was created by the annual payment of one half of one per cent on the capital stock of the state treasurer. This payment was only to continue until three per cent had been paid, and the fund thus created was to go to making good the payment of the circulation and other debts of any such banks as might become insolvent. Other States had different regulations, not all of them as wise as New York, perhaps, but each one establishing certain precautions.

Coincident almost with the rechartering of the United States Bank was the introduction of banks for savings. These institutions are a branch of banking that, while deserving an extended mention, must fall, under the lines of this article, within a brief space. Benevolent in conception and designed to afford the poor an opportunity to save in small amounts, their plan is simply one of deposit, on which the bank, as borrower, pays to the depositors, a fair rate of interest, and with the advantage of a large capital, the aggregate of many small deposits, makes advantageous investments unattainable to small capitals such as the individual depositor could control. They differ from regular banks because of their philanthropic purposes, in being exempt from taxation, and in not loaning or investing their funds on personal security. The first American savings bank was opened in Philadelphia in 1816 and was called the Philadelphia Savings Fund Society. The same year one was established in Boston, New York following in 1819, and in 1820 there were 10 in the country, having 8,635 depositors and \$1,138,570 in deposits. They have increased with the country, and in 1900 there were about 6,000,000 depositors, having to their credit \$2,384,770,849. For the year 1901-2 statistics showed 6,666,672 depositors and deposits of \$2,750,177,290.

For many years the Bank of the United States continued to grow more and more powerful. Its resources increased, its business extended, and it became a factor in the industrial and commercial life of the nation, such as had not been dreamed possible. On the first of November 1832 it was according to its own showing one of the richest institutions in the world. Its total liabilities, including the notes it had in circulation, its deposits, and the debts owing to holders of public funds, were \$37,296,950.20; while its assets, including specie, cash in Europe, and debts from industrial and banking companies, were \$79,593,870.97. This left the enormous surplus of \$42,296,920.77. It seemed as stable as any institution of its kind in the world, not excepting the famous Bank of England, and it afforded a currency for general circulation that was freely accepted everywhere. But the great power of the Bank of the United States had made it enemies, and a demand arose, upon Gen. Jackson's election to the presidency, that it should not be rechartered. The officers were chiefly of the party opposed to him. Immediately upon entering office the President announced that he would refuse to sign any bill extending the life of the Bank of the United States. He declared that it was dangerous to the liberties of the United States, and that it was unconstitutional. Shortly after this, the public funds were withdrawn from the bank. So great had been the prosperity of the country during the 20 years this bank had operated, however, that the war debt of the nation had been completely paid and a surplus of \$40,000,000 remained. This surplus, upon its withdrawal from the Bank of the United States, Congress voted to distribute among the States. The blow dealt to the great bank by this withdrawal was a terrible one, and with the loss of its charter impending and the unrelenting enmity of the administration, it was thought it must close. Nicholas Biddle, its president, determined not to give up, however, and on 18 Feb. 1836, he stole a march on President Jackson by having it incorporated by the State legislature as the Pennsylvania Bank of the United States. In this form, as a State bank, it continued to exist, but it never assumed the importance it had had before. It finally closed in 1840.

All this, however, took years to work itself out, and in the meantime much was happening in the financial world. The demise of the Bank of the United States as a national institution left the field to the banks chartered by the States. These at once made the most of their opportunity; and helped, as they were, by receiving on deposit large sums of the distributed public moneys, they increased rapidly, and 1837 saw 634 of them in the country, having an aggregate capital of \$291,000,000. With the great prosperity which, in the shape of State bank-notes, came over the country with these financial changes, arose a spirit of the wildest speculation. Public lands were the chosen field of the operators, and the dealing ran into millions. It was all based, though, on the current notes, many of these being issued by "wildcat" banks, and worthless. Trouble seemed certain, and President Jackson, in trying to establish our finances on a sound basis, issued his famous 'Specie Circular,' ordering all agents to accept nothing but specie in payment for the public lands. This precipitated the crash. The banks were called upon at once

BANKS AND BANKING

to redeem all their circulation in specie, and after vainly attempting to do so, they suspended payment on 9 May 1837. Six months later, no relief having come, a meeting of 136 delegates from banks all over the country was held in New York to consider whether means could be devised for resumption, but no relief at that time was found possible. It was during this unlucky year that, at President Van Buren's suggestion, the sub-treasury plan as it now exists was brought forward as a measure to prevent the loss of the public moneys by the failure of banks. It was defeated at this time, but three years later passed, only to be repealed in the succeeding year. Five years afterward, however, it was finally re-enacted. In May 1838, the New York banks resumed payment. They were followed in August by the Philadelphia and Southern banks, but these only held out for a little over a year, and on 9 Sept. 1839, suspended again. Despite all the trouble in which the banks were involved, they increased almost as rapidly as before. In 1840 their number had swelled to 901, with a total capital of \$358,000,000. The system of State banks, nevertheless, had grown unpopular, and the suspensions of 1837 and 1839 and the continuing uncertainty and lack of confidence caused a strong demand for a return to the old national banking system. At this time the presidential campaign in which Gen. Harrison was elected came on. One of the great issues on which this campaign was fought and won was that a new national bank should be established at once, and immediately upon his inauguration Gen. Harrison called a special session of Congress to consider the matter. But he was destined never to carry out the wishes of his party, for he died before Congress had convened, and his successor, President Tyler, twice vetoed the measure when it was passed and presented to him as a bill to establish a "financial agent of the government" "to act for it in all fiscal matters, and to facilitate mercantile exchanges throughout the country." This action on the part of the President settled the question of banks acting under the authority of the United States for many years thereafter, and until 1864 all banks of issue and deposit were operated under charters obtained in their various States. The effects of the lack of uniformity in the system were soon visible, not only in the stringency from 1840 to 1843, and the later suspension of 1857, but in the generally demoralized currency, which, with the exception of specie, had its standard of par only in its own neighborhood, and could be passed at any considerable distance only at a great discount. The farther away it went from the bank of issue the less it was worth. The State banks continued to put forth as many notes as they could pass. Many of these banks were perfectly solvent institutions, and were wisely conducted upon a sound basis; but truth compels the statement that many others were not, and at the root of the whole system was the lack of an essential uniformity. Bank failures were very common. It is worthy of mention here that throughout all the vexations and inconveniences caused by the State banks in their day, New England was little affected. What was known as the Suffolk Bank System was there in use; by this the Suffolk Bank of Boston redeemed and collected for all New England banks, each of which had a stipulated deposit,

the whole aggregating \$300,000, with the Suffolk Bank for this purpose.

The stringency of 1840-3 having been safely tided over by the banks, better times appeared, and a stiff further impetus was given to our national prosperity in 1849 by the discovery of gold in California, developing great activity both industrially and commercially. In the next four or five years the one event which stands out conspicuously in American banking was the establishment on 11 Oct. 1853, of the New York Clearing House Association. This association, of the utmost importance in expediting and giving security to the great banking interests of the country, began with a membership of 52 banks. Its system, so simple and yet so effective that it seems almost impossible its origination and establishment could have been so long delayed, is that by which each bank, instead of presenting separately to the other banks for payment such of their checks as it holds and in its turn paying cash to all the other banks for such of its own checks as they hold, sends them all at a certain hour to the clearing house. Here all the checks are assorted, a clerk being present from each bank having a membership; and the sum total of the checks each bank presents, compared with the sum total of the checks presented against it, gives a balance for which the clearing house draws its check, and transactions that would have taken many clerks and messengers a whole day to complete, are finished in an hour or a little more. In addition to the convenience of this system, its beneficial effect in economizing currency is immense. When it is remembered that the great banking interests which centre in New York having transactions daily involving exchanges of from \$100,000,000 to \$200,000,000, it will be readily understood what a vast loss such an amount of idle money would entail under the old system of separate clearance payments. The clearing house, with its system of balances, is able to settle it all by the use of from $3\frac{1}{2}$ to 4 per cent of the total currency amount involved. In addition to these advantages, the clearing house is an assurance of protection for its members, and in its more extended operations of issuing loan certificates at critical times has been a bulwark of safety to the banking interests of the whole country. By its help, at the outbreak of the Civil War, the New York banks were enabled to come instantly to the assistance of the government with large sums, which they could scarcely have commanded otherwise; and later, in the panics of 1873 and 1893, the issuance of \$25,000,000 in loan certificates on the first occasion, and nearly \$50,000,000 on the second, again did much toward enabling the banks to withstand the terrible pressure of those times. Between these years the average daily exchanges of the clearing house were \$105,964,277 and the average daily balances \$3,939,265. At present 66 banks are members of the Clearing House Association. Besides these, 81 other banks and trust companies which are not members are cleared here through the banks which belong to the association. A sixty-seventh member of the Clearing House Association is the assistant treasurer of the United States at the sub-treasury in New York. Almost 90 per cent of the government expenditures being made in New York by check, the membership of the assistant treasurer greatly facilitates clearance. The advantages of

BANKS AND BANKING

the clearing-house system were immediately recognized when the New York association started, and Boston, Philadelphia, Chicago, St. Louis, and other cities soon adopted it.

Returning to 1853, the banking interests of the country continued much in the same condition, but trouble was already brewing from over-speculation, and in 1857 the great financial and industrial depression, which was fortunately as short as it was sharp, struck the country. The great storm broke on 24 August of that year, when the Ohio Life and Trust Company suspended with liabilities of \$7,000,000. It was a terrible failure, and on 25-26 September the Philadelphia banks were forced to suspend; a general suspension in Virginia, Maryland, Rhode Island, and the District of Columbia soon followed. The trouble increased in New York, and a run on the banks threatening serious consequences, the legislature on 14 October authorized a suspension of specie payments for one year. The banks accordingly closed, but on 24 December, after only two months, the city banks resumed. The Massachusetts banks also suspended, and the panic became general in New England, factories being shut down, banks closed, and troops held in readiness to suppress anticipated riots among the great crowds who were thrown out of work. Fortunately the trouble did not last long, but while it existed there were 5,123 failures, with total liabilities of \$291,750,000. The resumption of banks and renewal of business was general early in the succeeding year, and that the banks of the country suffered as little as any of the great interests affected is shown by the fact that in 1860, one year prior to the long suspension of specie payments caused by the war, there were in the country 1,562 banks, with an aggregate capital of \$422,000,000 and a circulation of about \$207,000,000. They held in specie at the time \$83,594,537, and were credited with deposits of \$254,000,000.

During the next four years the part played by the banks was loyal and patriotic, but the history of that time with its government issues of "legal tenders" comes more properly within the domain of national finance. The national banking law, which regulates the banks to-day, was passed 3 June 1864. Its provisions are simple and eminently secure, and in their operation have proved more satisfactory. They require a company of five persons or more and a fully paid-up capital. As a security for their notes of issue they are obliged to hold the government's pledge in the form of United States bonds, on which they are allowed circulation by the comptroller of the currency up to 90 per cent of their par value. Shortly after this law was passed, Congress placed a prohibitive tax of 10 per cent on the circulating notes of the State banks, so that for the first time since 1836 the currency of the country returned to the original basis of the national credit, where it has since remained. The national banking law had no sooner passed than many of the old State banks began changing to the new system. While the war lasted the number of the national banks was about 500. Those that remained under the old State charters continued to do, as they are doing to-day, a general banking business of discount, loan, and deposit, but the circulation of their notes became impossible owing to the tax. When the national banks were first organized Con-

gress had provided that the total circulation to be allotted them by the comptroller of the currency should not exceed \$300,000,000. So rapid was their increase, however, that four years later the full amount of these notes had been issued, and there were 1,629 national banks with a paid-in capital of \$426,189,111. Of these banks Massachusetts had 207; New York, 299; Pennsylvania, 197; and Ohio, 133. Two years later, inconvenience being experienced because the limit of circulation had been reached, Congress authorized an extra issue of \$54,000,000, which was almost immediately taken up.

The following year (1873) saw the disastrous ordeal of panic and distress through which it was inevitable the nation should pass on its return from the inflation caused by the great war loans to the sound and normal basis of peaceful prosperity. It was passed without wreck, although commercial and financial interests suffered heavily. In 1875 Congress removed all restrictions upon the total amount of notes the national banks might issue. It also voted the resumption of specie payment, which had been suspended since 1861, and decreed that it should take place 1 Jan. 1879. This resumption, it may be said, to the undying credit of the American nation, was accomplished without the slightest disturbance of business. Since then, the number of national banks in the country has increased steadily each year. With 2,047 banks, having an aggregate capital of \$497,864,833 and a total surplus of \$134,123,649 in 1875, the next 10 years showed, in 1885, the existence of 2,665, with capital amounting to \$524,599,602 and a surplus of \$146,903,495, making an increase of 618 banks and a gain of \$26,734,769 capital and \$12,779,846 surplus. Still growing and prosperous, the country continued to call for the further extension of the banks with their facilities and assistance, and in 1902-3 their number had become 5,005, having an aggregate capital of \$754,776,695.

In 1892 came upon the country the beginning of the depression of business and financial stringency that is now so happily showing signs of abatement. It came more gradually than such crises usually come and has been more persistent. Without actual panic the country verged perilously near to disaster. The money-broker, who had almost disappeared since the days of the war, reappeared and secured premium for currency of any sort. The banks had very little money of any kind, and for a time payments were almost wholly in certified checks. This showed that the trouble was not really organic, and vast sums of idle money, hoarded and withdrawn from circulation, further attested that the country was not impoverished. But confidence was lacking, and it operated as a check on enterprise which, reacting industrially as it always does, reached all classes and caused much suffering. It also gave rise to the great danger of a run being commenced on the savings banks. In the West, indeed, this did happen; and many perfectly solvent institutions were forced to the wall, being unable to realize quickly enough on their securities to meet demands. In New York, when the trouble became threatening, and a rush of eager, excited depositors was to be expected at almost any moment, the savings bank officials met, and taking advantage of the law, declined to pay any accounts without three months' notice. This saved the banks, but it was the nearest approach to suspension that had been known

BANKS AND BANKING

since 1873. The causes of the trouble have been matter for much discussion and difference of opinion during the past two years; and a belief that its roots lay in certain fallacies of national finance has caused action by Congress, which has undoubtedly been beneficial in its effect. Still, it is questionable whether the true seat of the difficulty has been, or will be, reached by any of these measures or plans of alleviation. An overreaching speculation, which had locked up resources that should have been available, coupled with great uncertainty and some apprehension, perhaps owing to political events and the commercial and industrial changes they might be expected to bring with them, had much to do with it.

In this brief résumé of a century of banking in America, the vastness of the present interests has been already foreshadowed. How enormous these interests are and of how general usefulness, words alone can convey no adequate idea. In figures only can expression be found for the financial magnitudes that make up the American banking interests of to-day. From the \$400,000 capital represented by Robert Morris' bank in Philadelphia a little over 100 years ago, the aggregate capital of the banks of the United States is now well above \$1,000,000,000, while one person in every seven or eight in the whole country patronizes the banks as a depositor and thus gains the privilege of their conveniences and economy. During the operation of the national banking system only 392 failures have been reported out of 6,862 banks organized. The solvency of the system is well evidenced in this, and safeguarded as the banks are by Federal and State legislation, with regular examinations by experts and sworn reports from officials, it is fair to say that no community enjoys greater security for its funds of deposit or exchange.

The very foundation of the American system for the past 30 years has been the national bank, which has opened its doors in nearly every town and hamlet of the country where the common business of life is transacted. It is a well-organized, carefully supervised, uniform system, which renders its benefits to the individual directly and indirectly, as well as in the revenue it affords the government. Statistics for 1902-3 give the number of national banks in the country as 5,005, in which there were about 300,000 shareholders. Their aggregate capital was about \$754,000,000, and their total surplus and undivided profits \$334,121,082. Pennsylvania has more banks with a smaller capitalization than New York and Massachusetts. Ohio ranks fourth.

As the national banks do not usually pay interest on current balances, the fact that they are utilized as banks of deposit to such a great extent shows the appreciation in which the facilities afforded by them for the transaction of business are held by the public at large. Since the national banking system started, upward of 30 years ago, the aid rendered through it to the business world in carrying on its undertakings has come to be fully recognized. The ruinous rates of exchange prevailing under the old State-bank system, prior to the war, are happily forgotten. A check or draft can be bought from a bank in New Orleans or San Francisco, drawn on its New York correspondent, which will cost but the smallest fraction of 1 per cent, or nothing at all, according to the time of year and the

direction in which money is moving. For this same exchange in 1859 the average rate was from 1 to 1½ per cent, a tax upon the extension of business that could not be borne in the present era of close competition and narrow margins. Again, on the total issue of about \$200,000,000 of State bank notes in circulation prior to 1860, a loss of from 1 per cent to 10 per cent was entailed upon the holders in any but the most restricted local transactions. The advantage of replacing this circulation of discount by a bank-note of uniform appearance, with value fixed by law and ordered receivable at par by every other bank in the system, was speedily apparent. Furthermore, behind this uniformity lies as security the quickest asset known, in the shape of the United States bond fully covering the circulation. Lawful money reserves further provide for the redemption of circulating notes by these banks, and a further reserve of deposit funds is ordered not alone to secure depositors, but to still further hedge about the reserves from possible impairment. In all these ways, as well as by the reductions achieved in rates of interest on loans and discounts, through making available a largely increased capital, together with lessened charges for collection made possible by thorough organization, the people have directly felt the benefits of improved banking methods. The immense aggregate saving that is accomplished annually along these lines can be gathered from the fact that the clearing houses of the United States in the single year of 1901 had clearings amounting to \$77,020,672,494. With such great sums as these, the smallest fractional charge possible becomes heavy in the aggregate of transactions.

Of the relation of the national banks to the government there is but little dispute, and practically but one opinion—that it is mutually beneficial. Until 3 March 1883 both capital and deposits of the national banks were taxed, and a further tax of 1 per cent on their circulation has been continued from the first. From these three items of taxation, the first two discontinued since 1883, an aggregate amount of \$144,660,952 had been yielded up to 18 July 1894. In addition to this a conservative estimate allows two fifths per cent of revenue to government on the national bank-note circulation, through failures to redeem, which forces the banks to make the full amount good before taking down their deposit of United States bonds against which the notes were issued.

As government depositories the national banks further perform without charge duties that annually save the government a great deal of money. Since their inauguration the national banks have received and stored in their vaults, at various times, almost \$4,000,000,000, a service of great value. As a governor of the national currency, operating to keep it within controllable bounds, the national banks have also been of the greatest assistance through the facilities they afford for the issue of instruments of credit. The depositors in the national banks in 1894 outnumbered by 492,702 those in all the State and private banks and loan and trust companies combined. As these, together with the national banks, are utilized for checking against balances on deposit rather than on those in banks for savings, it is readily seen that the check is more largely employed at the national banks than at the other institutions, and

BANKS AND BANKING — BANNERET

inasmuch as at least 53 per cent of even the retail, and consequently more largely cash, business of the country is transacted through the medium of these small pieces of paper, while from 90 to 92 per cent of the total business is thus transacted, the important part they play will be likewise readily understood. The circulating medium which, in a relative sense, these instruments of credit supply, is perhaps a relief that should counterbalance the complaint sometimes made regarding the non-elasticity of issue under the present national banking system. The average annual circulation of the national banks between 1864 and 1894 was \$282,801,252, and the security of the notes is absolute. A fluctuating market for bonds, against which only a percentage of issue is allowed, has undoubtedly made the lines of issue a little rigid, but whether more so than is consistent with proper precautions against possible manipulation or inflation is a matter of extreme doubt. In fact, so far as the system goes, it is the most perfect yet devised, and in its operation has united uniformity and stability with great facility of adaptation to the constantly arising needs of the commercial and financial interests.

On the national banks as a foundation, then, rests the great superstructure of state, private, and savings-bank institutions, which together with the building and loan associations and the loan and trust companies, constitute the remainder of the money-managing world of this country. Of the State banks there were in the United States 5,397 at the close of the fiscal year 1901-2, with aggregate resources amounting to \$2,309,358,715. These banks held a surplus of \$111,321,707. The aggregate deposits were \$1,698,185,287, and the loans and discounts \$1,260,741,058, excluding \$85,000,000 on real estate and other collateral security. Of United States bonds these banks held only \$2,693,811. The business is profitable, but in the average rather less so than that of the national banks. In all the respects of general banking the State banks transact the same kinds of business as the national institutions, with the exception of the issuance of circulating notes and the performance of those functions of a governmental nature entailed by a Federal charter.

The savings banks in existence in July 1902 were 1,036 in number and in two classes. Their total resources were \$2,893,172,986. The total amount of the deposits of individual savings is \$2,650,104,486. The total loans of these banks amount to \$1,275,319,102, of which only a very small percentage is secured on other than real or intrinsic values.

The private banks, numbering 1,039, almost exactly the same figure as the savings banks, are a most potent factor in the commercial world by their especial prominence in the field of foreign exchange. Their resources were \$169,364,435. The total of the loans and discounts was \$108,967,082, being \$23,000,000 less than the deposits.

The 417 loan and trust companies have total resources of \$1,983,214,707, of which loans and discounts are \$1,192,000,000. With the exception of the national and savings banks, these companies are the heaviest holders of United States bonds among the banks, \$1,594,219 being accredited to them.

These five branches constitute, properly speaking, the American banks. The building

and loan associations are a species of co-operative banking, savings, and loan business, and, since they started in 1840, have grown rapidly. They now have more than \$500,000,000 loaned on real estate alone. As nearly all the loans are small in amount, being simply enough to build a home for some comparatively poor person, the extent of this co-operative undertaking is readily seen.

Since the passage of the Currency act of 1900 the number of new banks organized was 1,598, having an aggregate capital of \$96,045,500, of which 1,041 were of \$25,000 capital each. During the existence of the national banking system 6,862 national banks have been organized, of which 72.9 per cent are in operation. In that time receivers were appointed for 392 banks.

Under these various heads, then, the banking interests of America have grouped themselves in the closing years of the 19th century. Beneath them all are the broad, strong shoulders of the United States government, bearing the final responsibility. In the magnitude of the interests now represented in the bank, all branches of industry and commercial activity have at last come to see their share. The bank is the agent of civilization in its advance, whether in new countries or new fields of human endeavor. The figures giving the resources of the banks of the United States tell most eloquently the commercial and industrial achievements of the American people. To this success the banking interests have contributed in no scanty measure, and in it they, in common with all the people, share to-day.

One very prominent feature in the history of banking has been the part played by private banks. It has been seen that Stephen Girard was very important in the history of Philadelphia banking, and later, Prime, Ward & King, bankers in New York, were enabled to perform eminent services for their country by loans negotiated in England. It was not, however, till about the time that the supply of gold from California raised the prices of commodities all over the globe, that many important American houses in banking circles became prominent. Every great city now has its private banks and bankers, who exercise an important part in the economy and distribution of wealth. They are able to handle business without making it known to the whole world; they can afford instant aid, without appeal to a board of directors, and everywhere they have proved of value. Such names as those of the Drexels, the Morgans, the Peabodys, and the Browns, will instantly occur to every one as household words in the realm of finance. See UNITED STATES — FINANCES OF THE.

LEVI PARSONS MORTON.

Ban'neker, Benjamin, American negro mathematician: b. Maryland, 9 Nov. 1731; d. 1806. At the age of 50 he began the study of mathematics for astronomical purposes. He published annually after 1792 an almanac devised by himself, and aided in determining the boundaries of the District of Columbia.

Ban'neret, an abbreviation of knight banneret; a member of an ancient order of knighthood which had the privilege of leading their retainers to battle under their own flag. A banneret was entitled to display a banner instead of a pennon. They ranked as the next

BANNOCK—BANQUETS

order below the Knights of the Garter, only a few official dignitaries intervening. This was not, however, unless they were created by the king on the field of battle, else they ranked after baronets. The order is now extinct, the last banneret created having been at the battle of Edgehill, in 1642, for his gallantry in rescuing the standard of Charles I.

Bannock, a cake once much eaten in Scotland. It was made of oatmeal, barley-meal, or peasemeal baked on an iron plate or griddle over the fire. From a supposed resemblance the turbot is sometimes called in Scotland the bannock-fluke.

Ban'nock. See **BANAK**.

Ban'nockburn, Scotland, a village in Stirlingshire, two miles southeast of Stirling, famous for the decisive battle fought near it, 24 June 1314, between King Robert Bruce of Scotland and Edward II. of England, in which the English, though greatly superior in numbers and equipment, were defeated. The Scots owed their signal success partly to their position and partly to the use of covered pits which rendered the English cavalry useless. The Borestone, where Bruce is said to have planted his standard, is still shown near a flagstaff erected in 1870. The village has manufactures of woollens, such as tartans, carpets, etc. Pop. (1900) 2,600.

Banns, the announcement of intended marriage, requiring the hearers to make known any cause why the parties should not be united in matrimony. By the publication of these banns is meant the legal proclamation or notification within the parish, district, or chapelry, of the names and descriptions of the persons who intend to be there married; the object being to secure public knowledge of intended marriages, and that all who have objections to the marriage may be enabled to state them in time. If the bridegroom live in a different parish from the bride, the banns must be proclaimed also in that parish, and a certificate of such proclamation must be produced before the celebration of the marriage. According to the old English canon law, the publication of banns might be made on holidays; but a change was made to Sundays by Lord Hardwicke's Marriage Act in 1753, and although that act was afterward superseded by the 4 Geo. IV. chap 76, the regulation as to Sundays has been since continued. Seven days' notice at least must be given to the clergyman before publication of banns. Banns were customary in various places before they were prescribed by the entire Church in the Fourth Council of Lateran. The Council of Trent ordered pastors to publish them at the principal mass in the parish church, or churches, of the parties, on three successive Sundays or festivals. This publication should be made within two months preceding the marriage. For grave reasons the bishop can dispense from this obligation. By the English Prayer Book the announcement is required to be made in the words of the rubric on each of the three Sundays preceding the ceremony. If objections are offered by anyone present, the clergyman cannot proceed further. Except in the Roman Catholic Church the custom of thus publishing the banns of marriage is practically obsolete in the United States.

Banquets. It was the famous Mr. Boswell who first defined man as a cooking animal, and yet, appropriate as the definition still is, neither mythology nor tradition offer any clue to aid the student in discovering when it was that the human animal first learned to cook. Of course, it is highly improbable that this secret was known to prehistoric man. Instead of knowing how to cook he undoubtedly ate his food raw, washing it down with pure cold water from the springs and brooks, and many years must have elapsed before he made the surprising discovery that the foods that satisfied his hunger could be vastly improved in taste if subjected to the influence of heat. All this, however, is little more than mere surmise for our only knowledge regarding the customs of eating in vogue during the remote past has been obtained from the relics unearthed by archæology. On walls now ruined and decayed the hand of the ancient painter and sculptor left a record of the customs of his time and from this source the student has been able to gather some little information regarding the gastronomic progress of the human race.

Such records, however valuable they may be in the absence of other facts, are vague and unsatisfactory at best, and so, turning to ancient literature, one finds that the earliest references to food preparation are contained in the Bible. In Genesis, when Abraham bade Sarah make ready three measures of fine meal that he might be prepared to entertain the angel, the student finds his first direct reference to breadstuffs, and, from that time, the Scriptures often make mention of some foods by means of which the reader may obtain a more or less correct idea of the slow stages by which this branch of the human race progressed from its habits of primitive simplicity to the stately banquets of King Solomon and the extravagant feasts of Belshazzar.

As our meagre records show that the art of feasting was practically contemporaneous with the Egyptians and the Hebrews it is not improbable that the latter race may have learned the secrets of good living from the former during the time of the captivity, for at the period when both Greek and Roman were still content with the simplest fare the Hebrews had been initiated into the pleasures of the table, a fact which explains the many quaint Biblical warnings against the sin of gluttony, as in Esdras, where it is said that "the faces of them that have used abstinence shall shine above the stars."

Among the ancient Jews all festive repasts were held toward the close of the day, after all matters of business had been concluded. If the feast was to be one of great ceremony guests were not only invited long before the occasion, but again, on the day and as near as possible to the hour appointed, servants were sent to their houses to deliver orally the second, or "express" invitation, which announced that the host was now prepared to receive his guests. As this "express" invitation was sent to none but those who had already declared their acceptance, honor and propriety required that they answer the summons at once and in person, a fact which explains and justifies the feelings of resentment which were entertained by the master of the house in the parable of the great supper, on which occasion, as will be remembered, each

BANQUETS

person invited met the bearer of the "express" with a frivolous apology for his inability to be present at the feast to which he had already accepted an invitation.

Guests at Hebrew banquets were required to bring their cards of invitation and these were presented to servants stationed at the entrance door. Upon being admitted the guests were conducted to the receiving-room where water, oils and perfumes awaited them. If the host desired to exhibit a great mark of courtesy he provided each guest with a richly embroidered garment, light and showy and cut in a flowing fashion, which all were required to wear during the feast.

If the banquet was of a private character the master of the house presided, but on occasions of public festivity a governor of the feast was selected and it was his duty to see that the banquet was not only properly conducted but that the company present preserved at least a semblance to order. Appointment to this office was always regarded as a great honor, and, among the Greeks and Romans, the position was prized so highly that the choice of the individual to fill it was often decided by chance, as by the throw of the dice.

The positions of the guests at the tables were not fixed by inviolable rule. Sometimes they selected their own places, while, at other times, they were arranged by seniority of family, or even according to the whim of the host who might desire to assign the most distinguished guests to places near his own person. In the earliest days, as is shown by the habits of the ancient Israelites, guests sat cross-legged around a low table and the custom of reclining while eating was not introduced until about the last of the Old Testament days. At least, it was about this time that the Jews adopted this custom, as well as the habit of having but two thirds of the table spread with a cloth, the portion where the food was to stand being left bare. In ancient Egypt and Persia the tables were arranged along the sides of the room and guests faced the wall.

At this time such articles as spoons, knives and forks were unknown and those who ate obtained the morsel they desired by dipping their slices of bread in the dish before them, folding the piece of meat or other food substance within it by the use of the thumb and two fingers. Later centuries saw the invention of the spoon but many hundred years elapsed before any other substitute for the fingers was suggested. Naturally the hands became besmeared with grease but they were cleaned by being rubbed on slices of bread, kept for that purpose. This bread was then thrown to the dogs who waited beneath the tables for just such morsels from the feast. If the fingers became too badly soiled, however, servants appeared with water and assisted the guests to wash by pouring a stream over the hands into a basin.

When the party was a large one it was the custom for two persons to eat from one dish and the host often showed the height of hospitality by dipping his hand into his own dish, lifting a portion of the food, and offering sop to his guest. To decline such an attention was a breach of etiquette that stamped one as being extremely ill-bred. In order that the hands should be always clean from dirt, however, the rabbis enjoined the "first water" and the "last

water," or the washing before and after eating, and, in the case of travelers at least, the "first water" included the washing of the feet. After the adoption of the reclining posture guests lay with their faces toward the table, the left arm resting upon a cushion and the feet stretched out behind, while during the progress of the banquet both head and feet were frequently sprinkled with perfume to overcome any unpleasant odor that might arise from too copious perspiration.

The foods served at these ancient banquets consisted of flesh, fish, fowl, melted butter, bread, honey and fruit, all of which were brought to the table at one time, the service being accomplished by the use of trays, the number and quality of the dishes varying under different circumstances. In ordinary cases the portion of each guest consisted of four or five dishes, but if the guest was a person of great distinction this portion was increased until the dishes became so numerous that they were piled one upon another, completely covering the table. All this food, which was usually prepared in liquid or with a sauce, as in a stew, had been cut into conveniently small pieces before it was served.

From the earliest days within the recollection of history sacrificial occasions have always included a banquet, however crude a festival it may have been, and it was the adoption of this custom that gave a religious as well as a social significance to so many of the Hebrew feasts. As the Lord's Supper of the Christians was derived from the Passover, so all the great religious festivals had, as their accompaniment, a domestic feast. On the occasion of the religious banquets, however, the wine was mixed according to rabbinical regulation, or with three parts water; four brief benedictions being pronounced over the cup before it was passed by the master of the feast.

The Greeks, like the Persians, began and ended their feasts with libations of wine, and some idea of the nature of an ancient Greek banquet may be obtained from the following curious account of a dinner given by Achilles in honor of Ulysses:

He cast down a great fleshing block in the firelight, and laid thereon a sheep's back and a fat goat's and a great hog's chine, rich with fat. And Automedon held them for him while Achilles carved. Then he sliced well the meat, and pierced it through with spits. Then, when the fire was burned down and the flames waned, he scattered the embers and laid the spits thereupon, after he had sprinkled them with holy salt. Then when he had roasted the meat and apportioned it in platters, Patroklos took bread and dealt it forth in fair baskets, and Achilles dealt the meat, and he sate himself over against godlike Odysseus and bade his comrade Patoklos to sacrifice to the gods, so he cast the first fruits to the fire. Then they put their hands to the good cheer lying before them.

Later, of course, the Greeks became more delicate eaters and vied with the Romans as to the elaborate character of their feasts. Like the Egyptians and Hebrews they reclined at table and their sumptuous repasts were divided into two courses: the first consisting of fish and meat, accompanied by the vegetables and several hors d'œuvres or entrees, while the second course comprised the pastry, fruits and other kinds of dessert.

As soon as the regular meal was finished the tables were removed and the floor was cleaned of all fragments. Other tables were then brought in by the servants, tables covered with

BANQUETS

salted cakes, cheeses and other foods provocative of thirst, as well as the great mixing bowls, the pitchers of water cooled in snow, and the jugs of unmixed wine, for the Greeks loved to drink heavily after eating, and as they drank, to an accompaniment of music, song and dances, young and handsome slaves garlanded their heads and breasts with twining vines and flowers, not, as has sometimes been said, as a sign of festivity, but because the garlands were supposed to cool the forehead and counteract the heady effect of the wines.

Like the Hebrews the Greeks obtained their first lessons in cookery from the Egyptians and they soon put them to good account. The Athenians were particularly apt pupils in the kitchen science and they finally came to excel the rest of Greece in gastronomic achievements just as the modern French excel the rest of Europe in this day. An excellent proof of this assertion is to be found in the circumstance that what is regarded as one of the most valuable of the lost works of antiquity is a didactic poem on gastronomy, written by Archestratus, the intimate friend of one of the sons of Pericles. "This great writer," says Athenæus, "has traversed earth and sea to render himself acquainted with the best things which they produced. He did not, during his travels, inquire concerning the manners of nations, as to which it is useless to inform ourselves, since it is impossible to change them; but he entered the laboratories where the delicacies of the table were prepared, and he held intercourse with none but those who could advance his pleasure. His poem is a treasure of science, every verse is a precept."

Among the great nations of ancient times the Romans were the last to learn the art of cookery. As late as the year 174 B.C. there were neither cooks nor public bakers in Rome, and the people were satisfied with and asked for nothing better than a kind of porridge made of pulse. This in addition to their vegetables and some leguminous fruits formed their principle articles of diet. The Asiatic wars, however, introduced the Romans to the luxuries of the table and, in a day as it were, Rome, discovering that it had a palate, went mad on the subject of gastronomy. Slaves who could cook, bake, or make sweets were brought to Rome in large numbers but, as every man of wealth was eager to purchase them, they brought the highest of prices.

As this was the dawning of the day of Rome's expansion it was not long before her agents began to supply her capital with dainties from all parts of the world. From the far East to the far West whatever seemed delicate of taste or that might help to tempt a nation of palates already craving a new flavor was brought to the cooks in the Roman kitchens. To improve the quality of his cuisine the Emperor Vitellius, one of the most enormous eaters the world has ever known, sent his legions to every part of the empire to shoot game for him, while entire fleets were employed in doing nothing but catching the fish that were to grace his table. In fact it seemed as if Rome, so long satisfied with the humblest of fare, could not find a sufficient variety of foods to gratify its desire for novelty.

Even as early as Cæsar's time, however, the Roman table was liberally provided with a variety of foods sufficient to satisfy almost any

appetite. As an example of a feast given in those days one may take the following menu which was served at a pontifical banquet long before the advent of the golden days of Imperial Rome:

The first course, which was intended to merely whet the appetite, consisted of conger eels, oysters, two kinds of mussels, thrushes served on asparagus, fat fowls, a ragout of oysters and other shell fish, with black and white marrons. The second course included a variety of shell fish and other marine animals, becaficos, haunches of venison, a wild boar, and a pasty of becaficos and other birds. The third, and principal course, comprised the udder of swine, boar's head, a fricassee of fish, a fricassee of sow's udder, ducks of various kinds, roast fowl, with pastry and Picentine bread.

As the years passed Rome experienced no deterioration in its love for the good things of the table. In fact, on the other hand, this pontifical menu was really a meagre bill of fare as compared to those which were afterward prepared by the Roman cooks for the delectation of the later Cæsars. As an illustration the following description of a banquet in the time of Nero, which is taken from Dean Farrar's 'Darkness and Dawn,' is admitted by students to be a vivid but not exaggerated picture of a feast in the days of Imperial Rome. At this banquet, which was prepared under the directions of Otho, Nero entertained eight guests. The walls of the room "were inlaid with mother-of-pearl and slabs of ivory. . . . The table was of cedar-wood, and it sparkled with goblets of gold and silver. . . . among which were scattered amber cups. . . . Although it was winter, garlands of exotic roses were provided for every guest, and none but the most youthful and beautiful of Otho's slaves were permitted to wait upon them. The supper was no supper of Trimalchio, with its coarse and heavy gluttonies. . . . The oysters were from Richborough; the lampreys were from the fishponds of a senator who was said to have flung into them more than one slave who had offended him; the mullet came from Tauromenos; the milk cheese from Sarsina. There were two tiny dishes which represented the last and most extravagant devices of Roman gourmets, the one composed of the tongues of nightingales, the other of the brains of Samian peacocks and African flamingoes, of which the iridescent and crimson feathers adorned the silver plates on which they lay. Sea and land had been swept with mad prodigality to furnish every luxury. The wines were of the rarest vintages, and whereas four kinds of wine were thought extravagant in the days of Julius Cæsar, Otho set 80 different sorts before his guests. . . . Hot mushrooms alternated with bits of ice." Perfumes were sprinkled on the hair and feet of the guests, and the amusements that were provided were dancing by Andalusian girls, dice and gambling. Offerings to the gods were not forgotten, however, and these were thrown into the hearth.

If this was a dainty repast, however, Rome was not always so dainty for the wealthy gourmands were not satisfied with eating well. They wanted to gluttonize, to eat of everything immoderately until they found it impossible to eat any more, when, by resorting to the ever-convenient feather, they were able to return to the

BANQUETS

feast and stuff themselves once more to repletion. On such occasions the more distinguished the company, the earlier began the banquet and the later it lasted.

Nor did the Roman table ever go dry for the want of rare and choice wines. In Greece the juice of the grape was almost invariably mixed with water, but Rome wanted no dilution of its revelling. Wildly extravagant and prodigal in everything, the Romans made no exception in the case of their drink. The wines that they used were preserved in jars or bottles of baked clay, and, as they were prized in proportion to their age, each receptacle bore a label on which it was distinctly stated in what consulship the beverage had been made. Many of these wines came from Italy, the Campania being considered the best, but the wines of Greece were also there, side by side with all the drinks that time or money could gather from every part of the world.

The fact that civilization and cookery go hand in hand was never more strikingly illustrated than in the case of the ancient Britons, for, in the earlier days of their history their cuisine was marked by all the limitations of primitive simplicity. The Roman conquest, however, appears to have applied to the kitchens of the country as thoroughly as to the government, for as the Roman conquerors were unwilling to eat the crude culinary preparations of the native Briton they proceeded to teach the conquered how to cook for them. Then, too, at about the same time, the appearance of the German immigrants, with their own more wholesome cookery, was not without its good effect, and the transformation in Mme Britannica's methods of cooking may be said to have been almost as wise as it was radical.

The centuries which succeeded the fall of the Roman Empire, and which comprised the greater part of the Middle Ages, was as dark a period for gastronomy as it was for all other arts. For a time it seemed as if man had forgotten how to cook; as if he had lost his taste for the well seasoned dishes which had once been his chief delight, and that he had no desire to get it back again. Even Charlemagne, who, according to his Capitularies, took a warm personal interest in his table, was a novice both in the art of cooking and in that of service, for his banquets were barbaric affairs composed of huge roasts of meat dripping from the spit, and other crude features that would have put the ancient Roman gourmets to the blush. Personally, too, the great Emperor of the West was extremely abstemious and seldom, even at dinner, permitted himself to be served with more than four dishes.

The reading of the description of Prince John's banquet in Sir Walter Scott's 'Ivanhoe' certainly gives the impression that the Normans, who appeared two or three centuries later, were justified in priding themselves upon their superior taste and discrimination in matters of eating, but even such flashes of light were but faint illuminations for so black a night for art as that of the dark ages.

Highly as the cuisine is esteemed to-day; idolized as it was before the fall of Rome and Greece called a halt upon civilization and placed a check upon progress, it seems somewhat strange that there was no one chronicler of

affairs bright enough to detect the fact that the revival in the lost art of cookery had commenced. As the historians of those days dealt in facts, not in manners, however, it is impossible to state at just what period gastronomy began to be cultivated again, although, of course, it is well known that its revival, like the revival in learning, was brought about in Italy. According to the best authorities, however, it was the merchant-princes of Florence who made the first attempt to improve the cuisine of the country and their experiments met with such success that their efforts were greeted with the most heartfelt encouragement by travelers from foreign countries who were invited to sit at their tables. It was to the Italian cuisine, in fact, that the French owed their instructions in the gastronomic art, for when Catherine de Medicis returned to Paris she carried several professors of the new cookery in her train. The effect of their importation was almost immediately noticeable. They improved the *pot-au-feu*; they expounded a new theory of taste; they expatiated upon the value of sauces, but, and this was more to the purpose so far as the progress of civilization was concerned, they introduced the art of making ices. Even the 16th century Montaigne, whose life was certainly cast in pleasant places, among the people who composed the best French society, was unable to appreciate the estimate that the Italian cooks of that day had so properly put upon their vocation. In one of his contemporaneous, if not somewhat reminiscent studies, he says:

I have seen amongst us one of those artists who had been in the service of Cardinal Caraffa. He discoursed to me of this science de gueule with a gravity and a magisterial air, as if he was speaking of some weighty point of theology. He expounded to me a difference of appetites that which one has fasting; that which one has after the second or third course, the methods now of satisfying and then of exciting and piquing it; the police of sauces, first in general, and next in particularising the qualities of the ingredients and their effects; the differences of salads according to their seasons; that which should be warmed, that which should be served cold, with the mode of adorning and embellishing them to make them pleasant to the view. He then entered on the order of the service, full of elevated and important considerations—

"Nec minime sane discrimine refert

"Quo gestu lepores et quo gallina secetur."

And all this expressed in rich and magnificent terms, in those very terms, indeed, which one employs in treating of the government of an empire.—I well remember my man.

The period which intervened between the arrival of Catherine de Medicis from Italy and the accession of Louis XIV. is one concerning which there is practically no authentic culinary record, although there is not the slightest reason to doubt that prodigious advances were made by the gastronomic art during that time. In fact, one has but to refer to one of the menus from the table of Louis XIV. to realize that cookery had ceased to be an experiment, and it is necessary to go but a step further and compare the foods of Paris in Louis' time with those in use in other parts of the world, to realize the progress that had been made by the French cooks by the middle of the 16th century. In Paris, for example, the foods were not dissimilar to those of our own day, to which the following menu of a dinner which was served to Emperor Charles V., by the city of Halle, would certainly be a contrast:

(1) Raisins in malt flour; (2) fried eggs; (3) pancakes; (4) steamed carrots; (5) fried slices of bread;

BANQUETS

(6) a covered porridge; (7) a high paste; (8) a pea-soup with marrow, covered richly with peas and eggs; (9) yellow codfish boiled in butter; (10) carps, boiled; (11) fried fish, with bitter oranges, spiced; (12) sweet pikes; (13) pulverized kernels, with almonds (14) maize in almonds' milk; (15) fried fish with small olives; (16) cakes; (17) pears and confect.

And during this time England, too, had made some little progress in the improvement of its cuisine, although Henry VIII. was one of the first monarchs who exhibited any liberality in rewarding originality in cookery. Henry, however, seemed unable to do enough for those who ministered to the gratification of his appetite, and on one occasion, he was so much delighted with the flavor of a new pudding that he presented a manor to its inventor.

From the early days when the housewives of Briton had adopted a cuisine which may quite properly be termed an amalgamation of German and Roman cookery England had maintained a position of her own in the world of gastronomy. By no means as ostentatious as the ancient disciples of the art; less dainty, perhaps, than the more modern disciples in the various European countries, their school of the kitchen was so largely their own that it is not strange that Cardinal Campeggio, one of the legates charged to treat with Henry VIII. concerning his divorce from Catherine should have been requested to draw up a report on the state of English cookery as compared with that of Italy and France, by the express desire and for the especial use of his Holiness the Pope.

There are certain historical documents connected with the Seymour family still on file in London, which throw a most interesting light upon the culinary customs in vogue in England during the reign of the Eighth Henry. They show, for example, the manner in which he was entertained at Wulfhall on the occasion of his marriage to Jane Seymour. The facts, presented in a paper prepared by the Duchess of Somerset, are as follows:

The king, with his whole household and nobility, arrived at Wulfhall on Saturday, 9 Aug 1539. They remained Sunday, Monday, and Tuesday. How or where so many were lodged does not appear, but "covers," as we should call them, "messes," as the book calls them, were laid for two hundred the first day. There are only two meals a day accounted for, and it appears that on Saturdays, as well as on Fridays, no meat was eaten, abstinence from flesh on those days having been ordered by a Royal proclamation, not only for health and discipline, but for the benefit of the commonwealth and the profit of the fishing-trade. The king's supper on his arrival, therefore, consisted only of fish.

Country places in Wiltshire must have been better supplied with fish than they are now, for the bill of fare included pikes, gills, salmon, tenches, lobsters, bream, plaice, trouts, congers, carps, roach, eels, potted sea-fish and salmon pasties, a sack of oysters, salt haberdine (which was cod-fish salted at Aberdeen), soles, and whittings.

The next day being Sunday, there were messes for four hundred, and the provisions amounted to 6 oxen, 2 muttons, 12 meals, 5 cygnets, 21 great capons, 7 good capons, 10 Kentish capons, 3 dozen and 6 coarse capons, 70 pullets, 91 chickens, 38 quails, 9 mewes, 6 grets, 2 shields of brawn, 7 swans, 2 storks, 3 pheasants, 40 partridges, 2 peachicks, 21 snipe, besides larks and brews—whatever they were.

It is scarcely necessary to trace the history of the banquet—which is, of course, but another name for the history of eating—with more close attention to detail. In contrasting the banquets of other days with those of to-day, however, one is struck by the fact that the modern peoples have also made some consider-

able improvement in the manner of eating and drinking, for one has but to turn to the menus of meals served at the beginning of the 19th century to find that dinners were not infrequently burdened by 20 or more entrees.

In the last century before the Christian era a stoic, Posidonius of Rhodes, in discussing the methods of cookery, took advantage of the opportunity to preach simplicity. He insisted that man, who had been blessed with good teeth, glands, and secretions, a tongue and the usual apparatus for digestion was independent of the cuisine, and this ancient pagan idea that the object of all repasts should be to take away the desire of eating and to maintain health and vigor has become more acceptable to thoughtful people during the past century. To-day our private banquets at least are simplicity itself when compared with those of even a century ago, and while their somewhat monotonous dearth of any entertainment except that of eating and drinking, with occasional music, has recently resulted in a sort of mania for the odd and eccentric, it is so obvious that these banquets are based upon the old desire for notoriety, the wish to dazzle which has inspired so many of the world's great feasts since the days of King Solomon's entertainment of the Queen of Sheba, that no particular attention is paid to such purple attempts to provide a novelty.

To obtain a correct idea of the modern banquet, however, the public banquet conceived and executed in the most perfect taste, it is only necessary to recall the dinner recently given at Compeigne by President Loubet of France in honor of the Czar and Czarina of Russia. One of the most magnificent and perfectly appointed affairs of modern times, its 500 covers were served at a cost to the French Government of something more than \$15,000, exclusive of the wines. And as these were the choicest brands and of the most ancient lineage their cost must have been fully as great as that of the dinner itself.

A story is told that upon this occasion the correspondent of one of the great foreign journals interviewed the chef for the purpose of securing some authentic details concerning the dinner. Among other questions he asked: "And what was the chief novelty of the menu?" Instantly the great man stood upon his dignity and his voice was strong in its wrath as he replied: "Novelties! I would have you know that on the table of the guests of our country we lay no second editions." A reply which might have been made by Vatel, the chef who killed himself, being unable to survive the dishonor of the table for which he was responsible.

In the various descriptions of President Loubet's banquet to the reigning sovereigns of Russia little is said in regard to the decorations or service, the writers confining themselves to the menu, that being the most important feature of the feast. Mention is made, however, that the flags, flowers, ribbons, and spun-sugar ornaments united in a decorative scheme with effectively beautiful results.

In regard to the menu, however, it is apparent that it left nothing to be desired. The soups were clear turtle and Creme du Barry, which gave the guests a choice, after which "came a wonderful dish of soft roes called on the bill of fare 'Caisses de laitances Dieppoise,'"

BANNOCK—BANTRY

and another, 'Barbues dorees a la Vatel,' served with a remarkable sauce in which a hundred elements harmonized in a perfect whole. Venison with an acid dressing and braised quail, the most delicate bird of the species, a native of the vineyards of central France, followed the entrees. Afterward, in turn came sherbets, granites, etc., succeeded by truffled pheasants with champagne sauce, salad Potel, named for the chef who invented it, and similar delicacies." The triumphal achievement, however, was a savory entremet which is described as a "small pudding of asparagus heads served with a cream sauce." Hot-house fruits, ices, cheese, and coffee comprised the final courses of the feast.

One of the exhibits which attracted the most attention at the last Paris Exposition was a service of Sevres which was admittedly the most beautiful and costly production that the famous potteries had ever attempted. Upon each piece of china was pictured a danceuse, but no two were the same in either pose or type of loveliness. Realizing that the one "hobby" of the czarina was her love for beautiful china, of which she already had a famous collection, including the best specimens of the work of all the great potteries of the world, it was decided to copy this magnificent service in every detail. It was thus used at the banquet and was afterward presented to the first lady of Russia in the name of President Loubet.

The occasion upon which one nation entertains the rulers of another nation is an event when, if at any time, even the most ostentatious display might be regarded as permissible. If contrasted with the seemingly manner of living in vogue among modern diners at ordinary times this banquet of the French President may, in some respects perhaps, have bordered upon ostentation. When compared to the extravagant feasts of other days, however, it seems striking in its simplicity, for nothing could have been in greater contrast to the extravagant luxury of the banquets of the ancients, to say nothing of that of many more modern rulers, that luxury which precedes, if it does not lead to, decadence.

MILES BRADFORD,
Author of 'Carlotta and I.'

Banquette, bǎn-kět', in fortification, the elevation of earth behind a parapet, on which the garrison of a fortress may stand, on the approach of an enemy, in order to fire upon them. Its dimensions vary, and it is frequently made double; that is, a second is made still lower.

Banquo, bǎn'kwō, a famous Scottish thane of the 11th century. In conjunction with Macbeth, cousin of Duncan, the king, he obtained a victory over the Danes, who had landed on the Scottish coast. Macbeth, shortly afterward, violently dethroned Duncan and caused him to be secretly assassinated. Banquo, though not an accomplice, was a witness of the crime; and being subsequently regarded by Macbeth with fear and suspicion, the latter invited him and his son, Fleance, to supper, and hired assassins to attack them on their return home during the darkness of night. Banquo was slain, but the youth made his escape. Shakespeare has interwoven this occurrence with the theme of his tragedy of 'Macbeth.'

Ban'shee, an imaginary female being supposed by some of the peasantry in Ireland and the Scottish Highlands to wail or shriek near a house when one of the inmates is about to die.

Bantam, bǎn-tam', or bǎn'tam, a province occupying the whole of the west end of the island of Java, and containing a population of about 520,000. It long formed an independent kingdom governed by its own sultan, but at the beginning of the 19th century was formally incorporated by the Dutch with their other possessions. Rice is now the staple product. Its capital, which bears the same name, was once the principal mart of the Dutch, and was surpassed by few towns of the East in antiquity and celebrity. It is now very much decayed. Bantam is believed to give name to the well-known small but spirited breed of domestic fowl.

Ban'tam, any one of various breeds of diminutive fowls kept for pleasure, and partaking of the characteristics of the several breeds which they imitate in miniature. Thus the game-bantams are miniatures of exhibition game-cocks, and weigh about 22 ounces. The golden and silver Sebright bantams originated in America from a cross between a Polish fowl and a bantam, and are exceedingly beautiful in plumage. The rose-comb bantams are little copies of Hamburg fowls, and should be either lustrous black or pure white; and the cocks have a rose comb, square in front, evenly corrugated, and ending in a spike with a slight upward curve. Booted white bantams are those which have their shanks heavily feathered. The Cochon fowl is imitated in all its varieties by a bantam the cock of which weighs about 28 ounces. Most beautiful of all are the Japanese bantams, of which there are several varieties. The typical one is white with the tail black, and composed of long, sickle-like, white feathers held erect and edged with white. The wing quills are dark slate color edged with white, so that when the wing is folded it shows only white.

Bantayan, Philippines, a town in the province of Cebu, 62 miles north of the town of Cebu. Pop. 10,000.

Ban'teng, a wild ox (*Bos sondaicus*) of the mountain forests of the Malay Peninsula and Archipelago (except Sumatra), which greatly resembles the gaur (q.v.), and is by some considered a variety of that animal. These cattle are exceedingly fierce, and are regarded by sportsmen as among the most dangerous of game. Nevertheless they have been tamed, and when crossed with the domestic cattle of the region yield a serviceable hybrid.

Bant'ing, William, an Englishman of notable corpulence: b 1797; d. 1878. By adopting a diet he was able to relieve himself of his superfluous flesh, and accordingly he wrote a pamphlet called 'A Letter on Corpulence' (1863), describing his system, which attracted so much attention that the term "to bant" has been incorporated in the English language to express the reduction of obesity by diet. See also OBESITY.

Ban'try, Ireland, a seaport town in county Cork, 56 miles west-southwest of Cork. It consists of four principal streets and a spacious square, but the town generally has a mean ap-

BANTRY BAY — BANZ

pearance. It has a growing trade, and fishing is carried on to some extent. Pop. (1901) about 3,000.

Bantry Bay, a deep inlet of Cork County, Ireland, remarkable both for its beauties and for its natural advantages, although the latter are turned to but little account. It is about 25 miles long and from 3 to 5 miles wide, and is safe and commodious for vessels of any size, the water being deep close to both shores, with few rocks or shoals. A French force tried to land here in 1796. The entrance is guarded by Crow Head on the northwest and by Sheep's Head on the southeast.

Bantu, bân'too, or bā-ntoo, the ethnological name of a group of African races dwelling below lat. 6° N., and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Kongo, etc., but not the Hottentots. The term is also used to denote the homogeneous family of languages spoken in Africa throughout the vast region lying between Kamerun, Zanzibar, and the Cape of Good Hope, with the exception of the Hottentot, Bushmen, and Pigmy enclaves. Ba-ntu, in almost all of these languages, signifies "the people," and hence is applied to the whole linguistic family. The Bantu family, although divided into hundreds of dialects, is evidently derived from one mother tongue.

Banu, ba'noo, or bân'noo, or **Bannu**, British India, a district in the Punjab; area 3,868 square miles; Pop. over 330,000. The district is watered by the Indus, which here, during inundations, becomes a vast body of water many miles wide. Nearly all the inhabitants are Mohammedans. Agriculture thrives, especially in the cultivation of the ordinary cereals, sugarcane, cotton, and various oil seeds. The chief towns are Trakhel and Kalabagh.

Banvard, John, American artist, poet and dramatist: b. New York, about 1820; d. 1891. He was best known by his panorama of the Mississippi River, covering three miles of canvas, which was exhibited in the chief cities of Europe and America. He wrote a great number of poems; several plays: 'Banvard, or the Adventures of an Artist' (1849); 'Pilgrimage to the Holy Land' (1852), etc.

Banvard, Joseph, an American Baptist clergyman and historical writer, brother of the preceding: b. New York, 1810; d. 1887. Among his writings were 'Plymouth and the Pilgrims' (1851); 'Romance of American History' (1852); 'Mémorial of Webster' (1853); 'Priscilla' (1854) a historical novel; 'Soldiers and Patriots of the Revolution' (1876), etc.

Banville, bân-vel, **Theodore Faullain de**, French poet and novelist: b. Moulins, 14 March 1823; d. Paris, 13 March 1891. He was the son of a naval officer, and went early in life to Paris, where he devoted himself exclusively to literature, contributed to many journals and reviews, and lived in close friendship with some of the foremost artists and men of letters of the day. First known as a poet through two volumes entitled 'The Caryatides' (1842) and 'The Stalactites' (1846), he established his reputation with the 'Odes Funambulesques' (1857), a sort of great lyrical parody, published under the pseudonym BRACQUEMOND, which immediately found great favor and was followed by 'New Odes Funambulesques'

(1868, afterward reprinted as 'Occidentales'); 'Russian Idyls' (1872); 'Thirty-six Merry Ballads' (1873); etc. His dramatic efforts did not meet with equal success, only 'Gringoire' (1866) holding the stage for some time. As a prose writer he is favorably known by a number of humorous and highly finished tales and sketches, like 'The Poor Mountebanks' (1853); 'The Parisians of Paris' (1866); 'Tales for Women' (1881); 'The Soul of Paris' (1890), etc. Of considerable literary interest is 'My Recollections' (1882).

Banxring, bânks'ring, a tree-shrew of Java. See TREE-SHREW.

Banyan, bân'yân, or bân-yân', or **Banian-tree** (*Ficus Benghalensis*), an East Indian tree of the natural order *Urticaceæ*, noted for the roots which descend from the branches and become accessory trunks, thus permitting the original tree to extend over a wide area. In the Calcutta botanical garden one specimen, known to be upward of 100 years old, has more than 3,000 small trunks, 230 that vary from 2 to 3½ feet in diameter, and a main trunk 13 feet in diameter. Among these trunks 7,000 people could stand. The trees often attain a height of more than 70 feet. The leaves are ovate heart-shaped, five to six inches long, the inconspicuous axillary flowers are succeeded by cherry-like scarlet fruits which are eaten by monkeys. The seeds seldom germinate on the ground, but usually among the leaf bases of palms, the roots descending the palm trunks, embracing and finally killing them. As the banyan ages its original trunk dies and decays, leaving the younger trunks to support the life of the tree. The Hindus ascribe various medicinal virtues to this tree, which they regard as sacred. Its light porous wood, its juice, and its fruit have no important economic uses. Its close relative, *Ficus indica*, which does not root from the branches, is sometimes erroneously called the banyan-tree.

Banyumas, ban-yoo-mas' (Javanese, "golden water"), a residency and town of Java. The area of the residuary is 2,100 square miles, and its population about 1,300,000. The chief culture is rice; but coffee, tea, sugar, indigo, cinnamon, and other exotics are produced by *corvée* labor, as enforced by the Dutch in other parts of Java. The town is on the river Serajo, 22 miles inland. Pop. about 9,000.

Banyuwangi, the extreme eastern district of the island of Java, noted for its extensive coffee gardens, and for the remarkably pure sulphur obtained from the Goonong-Marapi volcanic mountain. This is also the name of the capital, an important seaport and Dutch military post, on the Strait of Bali, about 550 English miles east-southeast from Batavia.

Banz, bân'ts, once one of the richest and most famous of the Benedictine monasteries, on the right bank of the Maine, three miles below Lichtenfels, Bavaria. Founded in 1071, and destroyed in the Peasants' war in 1525, it was rebuilt, and although plundered again in the Thirty Years' war it gradually became famed for the scientific attainments of its monks. In 1803 it was broken up, and its library and collections were divided between the Munich museum and other institutions.

BAOBAB — BAPTISM

Baobab, bā'ō-bāb (*Adansonia digitata*), a tree belonging to the natural order (or sub-order) *Bombaceae*, and forming the only known species of its genus, which was named after the naturalist Adanson. It is also called the monkey-bread tree. The leaves are deep green, and are divided into five unequal parts radiating from a common centre, and each lanceolate in shape. This tree is a native of western Africa and is likewise said to be found in Egypt and Abyssinia; it is cultivated in many of the warmer parts of the world. It is one of the largest known trees, its trunk being sometimes not less than 30 feet in diameter. In Adanson's account of Senegal some calculations are made regarding the growth of this tree, founded on the evidence of the annular layers. The height of its trunk by no means corresponds with the thickness which it attains. Thus, according to his calculations, at one year old its diameter is one inch; and its height five inches; at 32 years old it has attained a diameter of two feet, while its height is only 22 feet, and so on; till at 1,000 years old the baobab is 14 feet broad, and 58 feet high; and at 5,000 years the growth laterally has so outstripped its perpendicular height that the trunk will be 30 feet in diameter and only 73 feet high. The roots, again, are of a most extraordinary length, so that in a tree with a stem 77 feet in girth the main branch or tap-root measures 110 feet in length. It often happens that the profusion of leaves and of drooping boughs almost hide the stem, and the whole forms a hemispherical mass of verdure 140 to 150 feet in diameter, and 60 to 70 feet high. The wood is pale-colored, light, and soft, so that in Abyssinia the wild bees perforate it and lodge their honey in the hollow, which honey is considered the best in the country. The negroes on the western coast apply their trunks to a very extraordinary purpose. The tree is liable to be attacked by a fungus which, vegetating in the woody part without changing the color or appearance, destroys life and renders the part so attacked as soft as the pith of trees in general. Such trunks are then hollowed into chambers, and within these are suspended the dead bodies of those to whom are refused the honor of burial. There they become mummies, perfectly dry and well preserved, without further preparation or embalming, and are known by the name of *guirots*. The baobab is emollient and mucilaginous; the pulverized leaves constitute *lalo*, a favorite article with the natives, which they mix with their daily food to diminish excessive perspiration, and which is even used by Europeans in fevers and diarrhoeas. The flowers are large, white, and handsome; and in their first expansion bear some resemblance to the white poppy, having snow-white petals and violet-colored stamens. Both flowers and fruit are pendant, and the leaves drop off before the periodical rains come on. The fruit is of an oblong shape, of considerable size, and tastes like gingerbread, with a pleasant acid flavor. The expressed juice, when mixed with sugar, forms a cooling drink much used in putrid fevers; this juice is generally used as a seasoning for corn gruel and other food.

Baour-Lormian, bā-oor-lōr-myān, **Louis, Pierre Marie François**, French poet and dramatist: b. Toulouse, 1772; d. 1854. He first

attracted wide notice through his 'Poems of Ossian' (1801), an extremely clever imitation of Caledonian verse; and afterward won success with a tragedy, 'Omasis, or Joseph in Egypt' (1807). Other works of his are 'Political and Moral Vigils' (1811), in the manner of Young; 'Durant or The League in the Province' (1828), a historical novel; and 'Legends, Ballads, and Fables' (1829). But his best work is probably a poetical translation of the book of Job, completed after he had lost his eyesight.

Bapaume, bā-pōm, France, a town in the department of Pas-de-Calais, 12 miles south of Arras. Here, on 2 and 3 Jan. 1871, took place two fierce struggles between the French Army of the North and the Prussian Army of Observation; the French being defeated with a loss of over 2,000.

Baph'omet, the name of a mysterious image which the Knights Templars were charged with worshipping when the order was suppressed by Philip IV. of France. It is probably a corruption of Mahomet, and the charge may have arisen from the circumstance that some of the Templars had gone over to the Moslem faith.

Baptan'odon, an extinct ichthyosaurus or fish-lizard of the Jurassic period. Its remains have been found in the marine Jurassic shales of Wyoming and other western States, which have hence been called "Baptanodon Beds." It is distinguished from the true ichthyosaurus (q.v.) (found only in the Old World) by the form of the paddle-bones, which are rounded instead of polygonal, and was incorrectly supposed to be toothless, as its name indicates. The skulls are two to three feet long, so that the entire animal probably measured 10 to 15 feet, and resembled the ichthyosaurus in proportions and habits.

Baptism (from the Greek *baptizō*, from *baptiscin*, to immerse or dip), the application of water to a person as a sacrament or religious rite. It is generally thought to have been usual with the Jews even before Christ, being administered to proselytes, but was probably nothing more than a ceremony of purification. From this baptism, however, that of John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Matt. xxviii. 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments.

In the primitive Church the person to be baptized was immersed in a river or in a vessel, with the words which Christ had ordered, and a new name was generally bestowed at this time further to express the change. Sprinkling, or, as it was termed, clinic baptism, was used only in the case of the sick who could not leave their beds. The Greek Church and various Eastern sects retained the custom of immersion; but the Western Church adopted or allowed the mode of baptism by pouring or sprinkling, since continued by most Protestants. This practice can be traced back certainly to the 3rd century, before which its existence is disputed. Since the Reformation there have been various Protestant sects called Baptists, holding that bap-

BAPTIST—BAPTISTS

tism should be administered only by immersion and to those who can make a personal profession of faith.

The Montanists in Africa baptized even the dead, and in Roman Catholic countries the practice of baptizing church bells,—a custom of 10th century origin,—continues to this day. Being an initiatory rite, baptism is, therefore, administered only once to the same person. The Roman and Greek Catholics consecrate the water of baptism, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but among most Christians it is preceded by a confession of faith made by the person to be baptized, if an adult, and by his parents or sponsors if he be a child.

The Roman Catholic form of baptism is far more elaborate than the Protestant. This Church holds that baptism is a sacrament which has the effect to remove in the individual the penal consequences of the sin of Adam, to restore him to a state of supernatural grace, and to give him a right to the beatific vision of God, remitting all actual sins committed by the individual. It also imprints an indelible character, which is both an ornament to the soul and a capacity for receiving the other sacraments. The effect of the sacrament is produced *ex opere operato*; that is, by an act of the Holy Ghost infallibly accompanying the performance of the external rite. Bishops, priests, and deacons are the ordinary ministers of baptism, and all others are forbidden to baptize except in case of necessity. Baptism is, however, valid when duly administered by any person, and any one may lawfully baptize in case of necessity. On the part of children and others who have never attained the use of reason no dispositions are required. In order to receive the sacrament validly a person who has the use of reason must know what he is doing and intend to receive baptism. In order to receive the grace of the sacrament he must have faith, and, if he has committed mortal sins, repentance; otherwise the grace of the sacrament remains suspended until he acquires the proper dispositions. Besides sacramental baptism, called *baptismus fluminis*, there are two substitutes which can supply its place, called, in a wide and improper sense, *baptismus sanguinis* and *baptismus flammis*. The former of these is martyrdom, the second is the desire of baptism, accompanied by faith and perfect contrition or the love of God. These only supply the place of baptism when it cannot be had, and confer sanctifying grace, but not an indelible character. Solemn baptism is accompanied with the application of chrism and holy oil, and several other ceremonies of great antiquity, which are intended to symbolize the graces of baptism. By every mortal sin the sanctifying grace of baptism and the title to eternal beatitude are lost, but not the indelible character or the capacity and right to receive the graces belonging to the state of a member of the Church and a child of God, on condition of removing the obstacle of sin by penance.

Protestants hold that although the neglect of the sacrament is a sin, yet the saving new birth may be found without the performance of the rite which symbolizes it. Naming the person baptized forms no essential part of the ceremony, but has become almost universal, prob-

ably from the ancient custom of renaming the catechumen.

Baptist, John Gaspar, Anglo-Flemish painter: b. Antwerp; d. 1691. He came to England during the civil war and served under Lambert. He had in early life studied painting under Boschaert, and after the Restoration returned to his profession, and was often employed by Sir Peter Lely in painting draperies and backgrounds, and occasionally for similar purposes by Kneller. His skill was chiefly displayed in designs for tapestries.

Baptist Young People's Union of America, an association representing many young people's societies connected with the Baptist churches in the United States and Canada, organized June 1891 in Chicago, which place has since been its headquarters. Prior to the formation of the Union, the withdrawal of the Baptist societies was feared by the Christian Endeavor societies, and a plan of federation was suggested for the establishment of young people's societies over which no constitution should be required. This plan, with slight modifications, was accepted when the Union was organized. Conventions are held yearly.

Bap'tistry, literally the place where the ceremony of baptism is performed, sometimes denoting a separate building distinct from the church, but generally a part of the church used for this purpose. The most celebrated baptisteries are those of Florence and Pisa, belonging to the respective cathedrals of these cities.

Baptists, a religious body originating in England early in the 17th century as a result of the Separatist movement. Among the Separatists was John Smyth, who emigrated from Gainsborough with his people to escape persecution, and at Amsterdam established a new congregation upon the principle of baptism on confession of faith. Some members of this Church returned to England and in 1611 formed in London the first of the churches known as General Baptists, because they held the Arminian doctrine of a general atonement. The Particular Baptists (holding the Calvinistic doctrine of a particular atonement, that is, for the elect only) arose in 1633, when a number left a Separatist church in London to form a new congregation and were baptized anew on confession of faith. Another group withdrew from the same church in 1640, and shortly after introduced the practice of immersion, which was soon adopted by all the other churches and gave rise to the name by which they were known from 1644 onward. The Particular and General Baptists continued to be separate bodies until 1891, when they united.

There are other divisions among the general body, but all the churches agree in holding to the supremacy of the Scriptures as the rule of faith and practice; the necessity of personal faith and credible evidence of regeneration before baptism; immersion as the only baptism commanded by Christ or practised by his apostles; the independence of each church; and the entire separation between civil and ecclesiastical authority. On the question of communion English Baptists have been divided from the beginning. The earliest declarations were that only the baptized are authorized to partake of the Lord's Supper, but the practice of some churches was not in accord with this principle. At pres-

BAPTISTS IN AMERICA

ent many churches admit not only to the communion but to membership those who have not been baptized. There are at present in Great Britain and Ireland 2,747 churches with 372,219 members. Baptist missions have established churches in many of the countries of Europe, as well as in Asia and Africa, and in the world there are now 50,978 Baptist churches and 4,705,953 members. The English Baptists may be traced back through the Continental Anabaptists, the Waldensians, Petrobrusians, and various other sects, to the 11th century. None of these bodies regularly practised immersion, so far as we know, but they agreed in holding the fundamental Baptist principle of a regenerate Church and rejected the baptism of infants as an unauthorized and post-apostolic practice.

Baptists in America. (1) *From the first settlements to the Great Awakening*—There were a few Baptists (or, as they were then usually called, Anabaptists) among the early settlers of the colonies, especially Massachusetts, but the first Baptist church was of independent origin. Roger Williams, a graduate of the University of Cambridge, a Puritan unable to conform to the Church of England, emigrated to the Massachusetts colony and landed in Boston in 1631. Here he soon developed theories that made him obnoxious, and he was therefore banished by the General Court, 8 Oct. 1635. The chief count against him was that he denied the authority of the civil magistrate to punish religious offenses. He made his way to Rhode Island, purchased land from the Narragansett Indians, and founded the colony of Providence on the principle of complete separation between civil and religious affairs. His study of the Scriptures led him to reject infant baptism, and others having come to his opinion a church of 12 members was constituted. Williams was baptized by one of them, Ezekiel Holliman, and he then baptized the others. As there is no indication of subsequent change in the method of baptism, here or elsewhere, it is reasonable to conclude that American Baptists have practised immersion from the beginning. Not long after this a church was established in the colony at Newport under the leadership of John Clarke, an English physician. A Welsh Baptist church emigrated bodily to Massachusetts in 1633 and ultimately settled at Swansea in 1667. This church was not greatly disturbed, but in Boston the Baptists experienced severe persecution. John Clarke and Obadiah Holmes, of the Newport church, visited the colony to comfort and confirm in the faith the few scattered brethren there, and were arrested for holding a religious service in a private house in Lynn. They were sentenced to be fined heavily, and in default to be "well whipped." This sentence was executed upon Holmes, in the streets of Boston, 6 Sept. 1661. Clarke's fine was paid by a friend, and he escaped. In 1665 a Baptist church was formed in Boston, consisting of nine members. Thomas Goad, its leading member and first minister, was so continuously imprisoned and ill-treated that his health was shattered, and he died in 1675. Other members suffered in like manner. A small meeting-house was built in 1678, whereupon the doors were nailed up by order of the court. The new charter of the colony, in 1691, granted "liberty of conscience to all Christians except Papists," but Baptists were still taxed for the support

of the churches of the "standing order." Even when the heavy hand of the Puritan official was restrained, progress did not become much more rapid, for prior to 1740 there were but eight Baptist churches in Massachusetts. In the other New England colonies growth was proportionally slow. The first church in Connecticut was that at Groton, established in 1705, probably by Baptists from Rhode Island.

The most marked progress of Baptists was in the group of colonies afterward known as the Middle States. The centre of this growth was the town of Philadelphia. In the near-by village of Pennepek or Lower Dublin (now incorporated in the city) a church was founded in 1688, mainly of Baptists from Great Britain, and a preaching-station was appointed in Philadelphia, which was not formally recognized as a separate church until 1746. The Welsh Tract Church was formed in 1701 in a place now in the State of Delaware. In the neighboring colony of New Jersey a simultaneous beginning had been made. The church at Middletown had been formed in 1688, and the following year a church that had been organized at Dover, N. H., emigrated in a body and became the Piscataway Church. Churches at Cohansey (1690), Cape May (1712), and Hopewell (1715) followed.

In the New York colony the first church was established at Oyster Bay, L. I., about 1700, and in 1714 a second church was formed in New York city—both organized through the labors of some Rhode Island Baptists. After 1730 the New York church ceased to exist, and it was not until 1745 that another attempt was made to found a Baptist church there; and so feeble was this that it did not attempt an independent existence until 1762.

The oldest church in the southern colonies was first constituted in Maine, then a part of the Massachusetts settlement. A few people at Kittery were baptized in Boston and organized a church, but they were so much disturbed by persecutions that they decided to emigrate to Charleston, S. C., and became the First Baptist Church of that city in 1684. Some General Baptists settled in the Virginia colony in 1714, and other churches were rapidly formed. From 1727 onward Baptist churches were founded in North Carolina, and a church was established in Maryland in 1772. The Carolina churches proved to be especially fruitful. From these feeble and unpromising beginnings there resulted a great growth during the remaining years of the 18th century.

The division that from the first existed among the English Baptists seemed likely to be perpetuated in America. In New England the majority of the earliest churches were or became Arminian in theology, and the first churches in the colony of New York appear also to have been of that order, together with several of the New Jersey congregations. But the Philadelphia group and part of the New Jersey churches were strongly Calvinistic, and gradually they took the lead and became the controlling force.

This result was promoted, if not caused, by the formation of the Philadelphia Association. The five oldest and nearest churches (Pennepek, Welsh Tract, Middletown, Piscataway, Cohansey) from the beginning cultivated close relations with one another, and were accustomed to hold "general meetings" with the various

BAPTISTS IN AMERICA

churches in turn, at which members of all the others attended as far as possible. These meetings were at first annual, and then came to be held twice a year, in May and September. As the churches grew, such mass-meetings became less practicable, and in September 1707, when the meeting was held in Philadelphia, the other churches sent delegates. The practice continued thenceforth without interruption, and so the first association of Baptist churches was formed. Such associations differ from the synods and conferences of other denominations in that they have no legislative or judicial authority over the churches, which retain their complete independence. The association has advisory powers only, and considers questions of common interest to the churches composing it, especially measures for the more effective spread of the gospel. It thus becomes a missionary and evangelic institution, and as such has been one of the most powerful agencies in the growth of Baptist churches in America.

The Philadelphia Association gradually drew to its membership not only all the Baptist churches of the middle colonies, but those farther south, and at its most flourishing early period had 31 churches on its roll, extending from New York to Virginia. By 1742, seemingly before, this association adopted a Calvinistic confession of faith,—in large part identical with the Westminster Confession,—and this Philadelphia Confession soon became by common consent the standard of faith and practice among American Baptist churches, and still holds that position over large regions. It ought to be added, however, that among Baptists no confession has any real authority, such documents being regarded as only convenient statements of what the Scriptures are believed to teach; and among Baptists it is to the Scriptures, and not to any confession, that appeal is always made.

2. *From the Great Awakening to the Founding of the General Convention.*—The spiritual movement known as the Great Awakening (q.v.), judged by its results, was the most important single event in the history of American Christianity. On no religious body did it have more happy, far-reaching and permanent results than upon the Baptists. The new spiritual life into which they were quickened is shown by the rapid advance made by them in all the colonies after 1740. In 40 years the churches increased in Massachusetts from 8 to 73, and the members from about 200 to over 3,000. This means, of course, that not only were many new churches constituted in the colonies already named, but that the other colonies were entered. From 1750, churches were organized in New Hampshire, and from 1780 in Vermont. In Maine the planting of churches began again in 1768. In 1784 there were in New England 151 churches with 4,783 members—an enormous increase, nearly 10 times the number of churches and quite 10 times the number of members that existed a generation before.

In the South the increase was even more rapid, especially in Virginia and the Carolinas. In Virginia the Baptists were rigorously persecuted, their preachers being imprisoned and fined with great severity, but even in prison they preached the gospel and made converts. The Kehukee Association, organized in 1765 in Virginia, and the Ketockton, in 1766 in North Car-

olina, testify to the rapid progress made in these regions. By a series of statutes passed between 1776 and 1798 Virginia repealed all her punitive and incorporating laws, and placed all forms of religious belief on an equal footing before the law. The progress of the Revolution so broadened men's ideas that the other colonies followed her example, although New England lagged behind, and Massachusetts did not fully banish intolerance from her laws until 1833. This principle of separation of Church and State, long advocated by Baptists and at length made the fundamental law of the United States, and of each several State, is recognized by foreign jurists as the most important contribution to political philosophy and the science of government yet made by America.

The war of the Revolution naturally caused a serious check to religious progress in the colonies, but less to the Baptists than to most other bodies. The Episcopal Church was badly disorganized, and almost destroyed, because her ministers were mostly Tories and were driven from their parishes; but the Baptist ministers were patriots, with but a single known exception. The Methodists were greatly embarrassed in a similar way—their preachers were nearly all from England, and John Wesley was a violent writer against the cause of the colonies and their "wicked rebellion." Except where actual hostilities prevailed, the Baptist churches suffered little, and as a whole were stronger at the close of the war than at the beginning, ready for an immediate advance and a rapid growth, since they could take advantage of every favorable opportunity.

And one of the greatest opportunities ever offered any religious body was theirs at the close of the war. The settlement of the great West began actively at once. Two great tides of immigration set westward: the one from New England, by the fertile valleys of central New York toward Ohio, and Illinois; the other from Virginia, Maryland, and Pennsylvania, over the mountains by the old Indian trail to Pittsburg, and thence into Ohio or down the river to Kentucky and Tennessee. Among the early settlers of these new regions were not a few Baptists; and the churches and associations in the older regions sent out missionary preachers to visit the new settlements and organize churches wherever possible. It thus came to pass that Baptist churches were often the first, always among the first, to be formed in the new communities of the West, and their growth was rapid. By the year 1800 the denomination had increased to 1,200 churches, and their members to more than 100,000. The formation of associations had kept pace with the growth of churches; prior to 1800 there were 48 such bodies formed, nearly all of which carried on active missionary operations for the planting of new churches and the aiding of those newly planted to sustain themselves. This missionary activity of the associations is the distinctive feature of the period, and more than any other thing explains that unexampled growth, far outstripping that of the population.

3. *From the Formation of the General Convention to Its Division in 1845.*—The most important forward step of American Baptists was their engaging in the work of foreign missions. This was done through no plan of their own, but in obedience to the leadings of Divine Providence.

BAPTISTS IN AMERICA

Some young men of New England Congregational churches, while students at Williams College and later at the Andover Theological Seminary, became deeply interested in the giving of the gospel to the heathen, and in consequence the American Board of Commissioners for Foreign Missions was constituted in June 1810. Three of the first missionaries sent out,—Adoniram Judson, his wife, and Luther Rice,—became convinced from independent study of the Scriptures that only believers should be baptized, and that immersion was the sole apostolic baptism. Accordingly they were baptized by English Baptist missionaries at Calcutta shortly after their arrival, and by consequence severed their relations with the Board that had sent them out. Mr. Rice returned to America to tell the story and enlist the Baptist churches in the support of these missionaries. This was comparatively easy, but by his tour among them the churches had become so aroused to their unfulfilled duty toward the heathen that they were not content merely to support the Judsons. Local missionary societies were formed in several States, and at length delegates from churches throughout the country met at Philadelphia in May 1814, and organized the "General Convention of the Baptist Denomination in the United States for Foreign Missions." This furnished the churches what they greatly needed,—a common cause, a rallying-point,—and at once the Convention and its work became a strongly unifying influence. The missionary work thus begun was prosecuted with zeal, liberality, and success. The Judsons went to Rangoon and began a mission among the Burmans in 1813; the Karens were reached in 1828; and missions followed among the Chinese (1833), Telugus (1836), and Assamese (1836).

For a time it seemed that all Baptist churches would unite in the support of this work, but after some years opposition began to develop among the churches that held to an extreme form of the Calvinistic theology. This opposition finally became directed against ministerial education, Sunday-schools, and all organization for evangelic effort, as well as against the Convention. The agitation of these extreme views finally led to a withdrawal of a part of the churches from all fellowship with the others, and those thus withdrawing became known as Old School, or Primitive Baptists, since they claimed to be faithful to the original principles of the body, from which the others had departed. The agitation was most bitter in the central Atlantic States, but the Primitive Baptists became most numerous in some of the southern States, especially Tennessee and Georgia, where, among the mountain districts, they are still very numerous. They are popularly known as "Hard Shells."

The Convention, in addition to its foreign missionary enterprise, also for a time conducted some home-mission operations, and local societies in several States were organized for this work. All of these agencies proved insufficient, and in 1832 the American Baptist Home Mission Society was formed in New York to take special charge of this enterprise, setting free the General Convention to devote its whole attention to foreign missions. But this was not the end of organization. The efficient conduct of home missions was found to demand further subdivision of effort, and after the second decade

of the century State conventions were rapidly formed in the various States for the supervision of missionary work in the older communities, leaving the national society to overlook the newer regions of the great West. The rise of Sunday-schools was synchronous with this development of missionary effort, and called into being new forms of organization. Among Baptists it gave new life to a tract society that had been formed in 1824 in Washington, and caused its removal to Philadelphia and its growth into the American Baptist Publication Society, which, since 1840, has given a great share of its capital and effort to the publication and circulation of Sunday-school literature. The work of foreign missions led to the making and printing of versions in the various languages of the mission fields. Some of these were printed by aid from the American Bible Society, formed in 1816 by representatives of the chief evangelical denominations; but after a time Baptists were denied equal rights in this body, and in April 1837 a convention held at Philadelphia formed the American and Foreign Bible Society for doing this work.

This was the period, not only of perfecting organization, but of controversies that resulted in great loss to Baptists. The rise of the body now known as Disciples of Christ, led by Alexander Campbell and others, from 1815 to 1835, caused great disturbance and loss to Baptists in the middle West and South. Mr. Campbell had been a Baptist preacher, and many Baptist churches went bodily into the new movement. In the Middle and Eastern States, during the same period, William Miller led many astray by his predictions regarding the speedy end of the world, and the ultimate result of his teaching was the formation of the Second Advent body, into which many Baptist churches and members went. At nearly the same time and in the same region the famous anti-Masonry agitation (q.v.) also convulsed the churches and hindered their progress, where it did not actually deplete their numbers. But this was also a period of great revivals and rapid numerical growth, not peculiar to any one part of the country. Beginning the century with some 1,200 churches and 100,000 members, Baptists had grown to 8,406 churches and 686,807 members in 1845, about one Baptist to each 32 persons of the population.

The greatest controversy of the period, and that which had most lasting results, was that caused by the institution of slavery. After about 1825 anti-slavery sentiment rapidly grew strong in the northern States, and among the Baptist churches of that region the opinion generally prevailed that a Christian man could not consistently be the owner of slaves. The General Convention had been organized on the principles of the Federal Constitution—of giving equal rights to slaveholders and non-slaveholders; but as in the State, so in the Church, this compromise proved unworkable after a time. For several years fierce debates were held on the subject at the meetings of the Convention, and the feelings of both sections grew more embittered. At length the Executive Board declared that they could not appoint a slaveholder as a missionary, and the southern churches felt this to be a denial of their constitutional rights. Accordingly in May 1845 a convention met at Augusta, Ga., and formed the Southern Baptist Convention. The mission

BAPTISTS IN AMERICA

work, home and foreign, of the southern Baptist churches has been done since that time through this body, under the supervision of various boards appointed for the purpose. This work was necessarily interrupted by the Civil War, but was resumed with new vigor at the conclusion of that struggle, and has been prosecuted with increasing liberality and success. The Convention is a strictly delegated body.

4 *The Last Half Century.*—The last 50 years have been a time of great increase in numbers and wealth. At the close of the 19th century there were 43,959 churches and 4,181,686 members, about one person in 18 of the population. The rate of progress has therefore been almost double that of the population, marvelous as the latter has been, and a very small percentage of this had been gained by immigration. The valuation of church property in 1900 was \$86,648,982, the expenditure for public worship \$9,622,166, the contributions for missions \$1,123,839, and for all other purposes \$12,348,527. Corresponding facts for 1850 and earlier years are not ascertainable, but it is certain that the wealth of the churches has increased fully twice as fast as the membership, and within the last 15 years the contributions have doubled, showing a commensurate growth of liberality.

But in this last half century the most marked feature of denominational progress has been in educational work. Very early in their history Baptists began to found colleges and other institutions of higher learning. Brown University was established in 1764, and was followed by Colby (1818), Colgate (1819), Columbian (1821), and Lewisburg (1846). Two theological seminaries were early founded, Hamilton (1817) and Newton (1825). In the West and South 16 other institutions that still survive were established before 1850, not to mention a few academies. The combined endowments of all these schools in 1850 would probably not have exceeded \$500,000. In 1900 there were 7 seminaries, 31 colleges, 32 schools for women only, 46 academies, and 17 schools for negroes and Indians. These schools had over 38,000 students enrolled, and in them has been invested over \$44,000,000, of which fully half is productive endowment.

Two thirds of the Baptists of the United States are in the south, and of these far more than half are negroes. The separate organization of the colored Baptists dates, of course, from the Civil War. The first of their State conventions was formed in 1866 in North Carolina, and like societies have been organized in 15 States. In the North a large part of their churches are members of the regular associations. The National Baptist Convention was organized in 1880, and was expected to perform an office for their churches similar to that of the Southern Baptist Convention for the white churches. But there have developed ambitious leaders among them, and divided counsels have resulted, and there has been in consequence a multiplying of organizations very confusing to those who attempt to follow their history and work. Owing to the lack of education among them, reports of meetings are defective and statistics untrustworthy, and no definite statements of their work can be attempted.

Besides what are often called the "regular" Baptists,—those in full fellowship with each

other and enumerated above,—there are numerous other bodies, aggregating 500,000 members, that hold substantially the same principles. The Freewill Baptists are perhaps the largest of these. The name describes two different groups of churches: one originating in North Carolina about 1729, and having its representatives mainly in the South; the other arising in New Hampshire about 1780. The former are known as Original Freewill Baptists, and practise foot-washing and anointing the sick with oil as gospel ordinances. The latter have of late adopted the name Free Baptists, are Arminian in theology, and practise "open" communion. They are strongest in New England and the Middle West. A general conference was organized in 1827, a Foreign Mission Society in 1834, and an Education Society in 1840. They now have about 85,000 members, and the southern churches may have 12,000 more. The Six-Principle and Seventh-Day Baptists also originated in New England. The former began in Rhode Island, where several of the earliest churches came to be known by this name. The churches of this order mostly held Arminian views, but differed from other Baptist churches mainly in insisting on the laying on of hands immediately after baptism, believing this to be one of the six principles enumerated in Heb. vi. 1, 2. The first Seventh-Day church was formed in Newport in 1671; their distinctive principle is indicated by their name. The German Seventh-Day Baptists had a separate origin in Pennsylvania about 1728, from the Dunkards or Tunkers, who settled in Germantown from 1719 and onward. They are sometimes called German Baptists, but that name is more properly applied to German congregations of the "regular" Baptists. The Church of God, or Winnebrennerians, the River Brethren, and one branch of the Mennonites, also agree in the main with the principles and practices of Baptists.

Besides the United States, Baptists are represented in all parts of North America, especially in Canada. Since 1778, Baptist churches have existed in Nova Scotia and New Brunswick, and about 1794 began a like movement in lower Canada, near the Vermont line. The organization of the Maritime churches came first, beginning with an association formed in 1800, and extending until a convention for general missionary purposes united several earlier societies in 1846. Churches were planted in Ontario after 1803, and organization proceeded along the usual lines. In 1888 all previously existing societies were consolidated by act of the Dominion Parliament into the Baptist Convention of Ontario and Quebec, which conducts its work through five executive boards. The Canadian Baptists have now grown to over 1,000 churches and 100,000 members.

In Mexico and the West Indies the Baptist churches are of recent missionary origin. The chief exception is in Jamaica, where English Baptists began operations nearly a century ago, the first church having been formed in 1816. The Southern Baptist Convention has taken Cuba as its special field, while Northern Baptists have established a mission in Porto Rico. In the West Indies, Mexico, and Central America there are now not far from 50,000 Baptists.

HENRY CLAY VEDDER,
Crozer Theological Seminary.

BAR — BAR-SUR-AUBE

Bar, Karl Ludwig von, German jurist: b. Hanover, 1836. He was trained in the universities of Göttingen and Berlin, and sat in the Reichstag 1890-3. He has been a strong advocate of publicity as well as of more humane procedure in all criminal trials. Important works by him are: 'Das Internationale Privatrecht und Strafrecht' (1862); 'Die Redefreiheit der Mitglieder gesetzgebender Versammlungen' (1868); 'Die Lehre vom Kausalzusammenhang in Rechte' (1871); 'Das Deutsche Reichsgericht' (1875); 'Staat und Katholische Kirche in Preussen' (1883).

Bar-Cochba, Simon, celebrated Jewish impostor of the 2d century A.D. who pretended to be the Messiah. He called himself, or was called by his followers, Bar-Cochba, meaning Son of the Star, and applied to himself Balaam's prophecy, "There shall come a star out of Jacob," etc. He obtained the support of the celebrated Rabbi Akiba, and availing himself of the general dissatisfaction produced among the Jews by Hadrian's attempt to erect a temple to Jupiter on the site of the temple of Jerusalem, raised the standard of revolt, and soon mustered numerous followers. After carrying on a kind of guerilla warfare, he made himself master of Jerusalem about 132, and gained possession of about 50 fortified places. Hadrian, who had at first despised the insurrection, now saw the necessity of acting more vigorously, and sent to Britain for Julius Severus, one of his ablest generals, who, avoiding a general engagement, gradually made himself master of the different forts which the rebels possessed, and then, though not without great loss, took and destroyed Jerusalem. Bar-cochba retired to a mountain fortress, and perished in the assault of it by the Romans three years after, about 135.

Bar, Russia, a town in the government of Podolia; so called after the birth-place of its foundress, Bona Sforza, the wife of King Sigismund I. of Poland. It is famous as the place where a confederation of the Polish people was held with a view to combating the Russian influence and the adherents of Russia in Poland, 29 Feb. 1768. The Russians took Bar by storm on the following 28 May, together with 1,400 men and 20 pieces of cannon. Eleven fairs are annually held here. Leather-dressing, distillery, and brick-making are carried on. Pop. (1900) 13,000.

Bar. In heraldry, one of the charges known as ordinaries. It is formed by two horizontal lines passing over the shield and occupying one fifth of the surface.

In hydrography, a barrier of sand in the channel of a river or along the seacoast. Rivers are constantly engaged in the transportation of sediment seaward, and whenever the current is checked the suspended material sinks and accumulates along the bottom. Bars thus formed may disappear during periods of floods when the water gains increased velocity, and they frequently change their position with slight alterations in the course of the current. Sand bars are also common at the mouths of rivers where the flow of the water, and therefore its transporting power, is lessened before entering the sea. The precipitation of the sediment is assisted in this case by the mingling of the fresh and saline water. The formation of

such bars does not differ from that of a delta (q.v.). The transporting action of currents and waves sometimes builds up a long line of bars or reefs along the seacoast, as is seen on the Atlantic and Gulf shores of the United States. See REEF.

In law, a word having several meanings; thus, it is the term used to signify an enclosure or fixed place in a court of justice where law-years may plead. In English superior courts queen's counsel are admitted within the bar; other members of the bar sit or stand outside. A railed-off space within the Houses of Lords and Commons is similarly called the bar. The dock, or enclosed space where accused persons stand or sit during their trial is also called the bar; hence the expression "prisoner at the bar." It has also a general meaning in legal procedure, signifying something by way of stoppage or prevention. There is also a trial at bar—that is, a trial before the judges of a particular court, who sit together for that purpose in banc (q.v.). The term is used both in England and the United States as a synonym for the legal profession.

In music, a line drawn vertically across the staff, for the purpose of dividing the music into equal measures of time. The term is very often improperly applied to measures themselves. The quantity of time included between two bars varies as the time is triple or common, the former being equivalent to three crotchets and the latter to four. The thick bar at the end of a piece of music is called the double bar. Bars were first used about the middle of the 15th century. See MEASURE.

Bar Har'bor, Me., a popular summer resort in Hancock County, Me.; on the east shore of Mount Desert Island. It derives its name from a sandy bar which connects Mount Desert with the largest of the Porcupine group. The surrounding scenery is very pleasing, and within a short distance are many points of interest readily accessible to the tourist. Among these are the summit of Green Mountain, Eagle Lake, Mount Newport, Kebo, The Ovens, Great and Schooner Heads, Spouting Horn, Thunder Cave, and Eagle Cliff. Pop. (1900) 1,600.

Bar Shot, a double-headed shot, made of two half-balls connected by a bar, and formerly used in naval battles for cutting away the masts and rigging of the enemy's ship.

Bar-le-Duc, bar-lě-duk, or **Bar-sur-Ornain**, bār-sur-ōrnān, France, capital of the department of Meuse, 125 miles east by south from Paris. It consists of an upper and a lower town, the former of which commands a fine view. The lower town extends into the valley traversed by the Ornain, here crossed by three stone bridges. It is a busy active place, with many shops, manufactories, and warehouses. The streets are wide and well laid out, but the public buildings are inferior. The chief manufactures are cotton yarn, cotton, and woolen stuffs, printed calicoes, and colored handkerchiefs. The preserved fruits and confectionery, as well as the wines of Bar-le-duc, are in repute. Pop. (1896) 18,249.

Bar-sur-Aube, bār-sūr-ōb, France, a town 30 miles east of Troyes, notable as the scene of a victory of the allied forces commanded by Schwarzenberg over the French, commanded by Macdonald and Oudinot, 27 Feb. 1814. The

council which decided the plan of campaign of the allies was held here the day before the battle. Pop. (1896) 4,548.

Bar-sur-Seine, bār-sūr-sân, France, an ancient town in the department of Aube, notable as the scene of a victory of the allied forces over the French, in March 1814. Pop. (1896) 3,157.

Bara, bār'a, **Jules**, Belgian statesman: b. Tournai, 1835; d. Brussels, 26 June 1900. He early displayed oratorical gifts, and soon after beginning the practice of law was appointed professor of law in the University of Brussels. He entered the House of Deputies in 1862 as a Liberal, and was appointed minister of justice in 1865. For the remainder of his career he was prominent in the Liberal ranks whether in the Cabinet or as a member of the House of Deputies, his power of scathing invective being instrumental in causing the resignation of the clerical ministry of d'Anethen in 1871 and the fall of that of Malou in 1878.

Baraba, bā-ra-bā', a steppe of Siberia, in the government of Tomsk, occupying more than 100,000 square miles. Covered with salt lakes and marshes, it was colonized in 1767 by the Russians, who have since cultivated parts of it. Pop. 250,000.

Barabas, bā-rāb'as, the principal personage in Marlowe's tragedy, 'The Jew of Malta,' an abnormal type of humanity whose delight is in torture and murder.

Barab'bas, the robber released by Pilate at the Passover when Jesus was condemned to death. It was a custom of the Roman government, for the sake of conciliating the Jews, to release one Jewish prisoner, whom they might choose, at the yearly Passover. Pilate desired thus to release Jesus, but the Jews demanded Barabbas (Matt. xxvii. 16-26).

Barabbas: A Dream of the World's Tragedy, a romance by Marie Corelli. It is the story of the last days of Christ, his betrayal, crucifixion, and resurrection. The story is dramatically told, but the style is florid and meretricious, appealing more to the emotions than to the reason.

Barabins'ki, a Tartar tribe living on the banks of the river Irtish, and engaged in pastoral and agricultural pursuits. Their religion is Shamanistic, but Christianity has made some progress among them.

Baraboo, bār'a-boo, Wis., a city and county-seat of Sauk County, on the Baraboo River, and the Chicago & N. W. R.R.; 40 miles northwest of Madison and 3 miles from Devil's Lake. It is an agricultural region; has important manufacturing interests, which are promoted by an excellent water power; is a noted fruit centre; and has a national bank, city hall, water works, electric light, gas works, daily, weekly, and monthly periodicals. It is governed by a mayor, elected biennially, and a municipal council. Pop. (1900) 5,751.

Barabra, bā-rā'brā, a Nubian people living on both sides of the Nile, from Wady Halfa to Assouan. They are about 40,000 in number, and are believed to belong to the same stock as the ancient Egyptians.

Baracoa, bā-ra-kō'ā, Cuba, a seaport near the eastern end of the island, and its capital,

1518-22. The town was founded in 1512. Near it is the mountain noted as the "Anvil of Baracoa." In the vicinity Maceo and his men began in 1895 the struggle for Cuban independence. Pop. (1899) 4,937.

Barada, bā-ra'dā, the Abana of the Bible, a river of Syria, rising in the Anti-Libanus and flowing across the plain to the east past Damascus. It loses itself in a lake called Bahret-el-Ateibeh. Around Damascus its waters are used for irrigation by means of canals.

Baraga, bār'a-ga, **Frederic**, Austrian Roman Catholic prelate and missionary: b. Treffen, Carniola, 29 June 1797; d. Marquette, Mich., 19 Jan. 1868. He came to the United States in 1830 and spent the rest of his life among the Chippewa and Ottawa Indians in Michigan. His Chippewa grammar (1851) and Chippewa dictionary (1851-3) are of philological importance, and he was also the author of a work in German on the 'History, Character, Manners, and Habits of the North American Indians' (1837).

Baraguay d'Hilliers, bā-ra-gā-de-yā, **Achille**, Count, marshal of France: b. Paris, 1795, d. 1878. He was the son of Louis Baraguay d'Hilliers (q.v.). In 1830 he took part in the expedition to Algeria, in which his success gained him the confidence of the government, which created him a lieutenant-general. In 1841 he was made governor-general of Algeria. On the fall of Louis Philippe in the revolution of 1848 the provisional government appointed him to the command of the military division of Besançon. He replaced Changarnier in the command of the Army of Paris, and concurred in the accomplishment of the *coup d'état* on 2 Dec. 1851. In the war with Russia in 1854 Baraguay d'Hilliers was commander-in-chief of the Baltic expedition, and for his services received the dignity of marshal of France, and later was nominated a senator. He took an active part in the campaign of 1859, when France leagued with Sardinia to free Italy from Austrian domination.

Baraguey d'Hilliers, Louis, French general: b. Paris, 1764; d. Berlin, 6 Jan. 1813. Receiving an appointment in the army of Italy from Napoleon, he shared all the success of the campaign of 1796-7. Made general of division and commandant of Venice, in 1798 he accompanied the expedition to Egypt; and afterward successively held appointments on the Rhine, in the Tyrol, and in Catalonia. He commanded a division in the Russian campaign of 1812, but during the retreat incurred the displeasure of Napoleon and appears to have died from chagrin and disappointment.

Baralt, bā-rālt', **Rafael Maria**, Venezuelan poet and historian: b. Maracaibo, Venezuela, 2 July 1814; d. Madrid, Spain, 2 Jan. 1860. He was educated in Bogotá and at Caracas; served in the Venezuelan army, and went to Spain in 1843, where he held posts of honor and attained literary fame. He wrote 'Ancient and Modern History of Venezuela' (1841); and 'Odes to Columbus and to Spain.'

Baranoff, bā-rā'nōf, **Alexander Andreovich**, Russian trader: b. 1746; d. 1819. He founded a trading colony on Bering Strait (1796) and established commercial relations with the United States, China, and Hawaii. He was the first governor of Russian America.

BARANOFF ISLAND — BARBADOS

Baranoff Island, the most important of the Alexander Islands, Alaska. It is about 75 miles long. On its northwest coast is the town of Sitka. The island derives its name from the Russian trader, Baranoff (q.v.), who in 1799 took possession of it.

Barante, bā-rañt, **Aimable Guillaume Prosper Brugière, Baron de**, French historian and statesman: b. Riom, Auvergne, 10 June 1782; d. 23 Nov. 1866. After filling some subordinate offices he was appointed in 1809 prefect of La Vendée. In this year was published his 'Tableau de la Littérature Française au XVIIIe Siècle,' of which Goethe has said that it contains neither a word too little nor a word too much. In 1815 Louis XVIII. made Barante secretary of the Ministry of the Interior, and about the same time he took his seat in the Chamber of Deputies, where he voted with the Moderate Liberals. In 1819 he was raised to the Chamber of Peers. His principal work, 'Histoire des Ducs de Bourgogne de la Maison de Valois, 1364-1477' (1824-8), secured his election to the Academy in 1828. Between 1830 and 1840 he represented France at Turin and St. Petersburg, but after the revolution of 1848 he devoted himself entirely to literary pursuits. Other works of his are: 'Histoire de la Conventionale' (1851-3); 'Histoire du Directoire' (1855); 'Etudes Historiques et Biographiques'; 'Etudes Littéraires et Historiques' (1858). Consult also 'Souvenirs du Baron de Barante' (1890-9).

Baran'ya, Hungary, a province of, bordering upon the Danube River, having an area of 1,966 square miles and a population of 361,743 in 1900.

Barasingha, bār-a-sin'gā. See SWAMP-DEER.

Barat'ria Bay, a body of water in the southeastern part of Louisiana, extending north from the Gulf of Mexico, between the parishes of Jefferson and Plaquemine. It is about 15 miles long by 6 wide, and it and the lagoons branching out of it were rendered notorious about the years 1810-12 as being both the headquarters and rendezvous of the celebrated Lafitte and his buccaneers.

Barat'ria, Pirates of, a company of outlaws, under the leadership of a notorious bandit, Jean Lafitte, who established their rendezvous in the Bay of Barataria, 40 miles south of New Orleans. They committed great depredations on English and Spanish shipping, but their colony was broken up in 1814 by a United States naval force. Lafitte and some of his men subsequently served under Jackson in the battle of New Orleans.

Bar'athron, the name of a deep gorge near Athens, into which criminals condemned to death were thrown. It was originally a quarry, but was enlarged in order to serve for purposes of punishment. Usually persons were thrown into it after execution, but occasionally while living.

Baratier, bā-rā-tēr', **Johann Philipp**, German littérateur, remarkable for the precocity of his intellect: b. Schwabach, 1721; d. Halle, 5 Sept. 1740. At the age of 7 he understood Greek and Hebrew, and 2 years later he compiled a Hebrew dictionary. He was 13 when he translated the 'Itinerary of Benjamin of Tudela.' Excess of work and perhaps a too rapid

development of his intellectual faculties brought about a languid malady, and at the age of 19 he died.

Baratynski, bā-ṛā-tīn'ske, **Jevgeni Abramovich**, Russian poet: b. within the government of Tambov, 1800; d. Naples, 1844. He enlisted as a private soldier at 18, and by 7 years' service in Finland fought his way to the rank of an officer, which, however, he soon resigned to devote himself to a literary life. His first poem, 'Eda,' is a mirror of Finnish life and feeling: his greatest, 'The Gypsy.'

Barb, a horse of the Barbary breed, introduced by the Moors into Spain, and of great speed, endurance, and docility. This breed is said to be a variety of the Arabian, and most of the progenitors of the present thoroughbred horse were of the same strain.

Bar'bacan, or **Barbican**, a projecting watch tower or other advanced work before the gate of a castle or fortified town. The term barbican was more especially applied to the outwork intended to defend the drawbridge, which in modern fortifications is called the *tête du pont*. At the castles of Warwick and Alnwick the mediæval barbicans still remain, but the barbican gate at York is almost entirely of modern construction.

Barbacena, bar-ba-sā-'na, a flourishing town of Brazil in the State of Minas Graes, 125 miles northwest of Rio de Janeiro. It is situated in the Mantiqueira Mountains, about 3,500 feet above the sea. Pop. 5,000.

Barba'dos, an island of the West Indies, lying in the Atlantic Ocean more than 100 miles east of the nearest members of the chain of Lesser Antilles. (See ANTILLES.) No other country, with the possible exception of some of the provinces of China, is more densely populated, the inhabitants (about 20,000 white persons, and approximately 169,000 negroes) averaging 1,120 to the square mile. The entire area of the island available for the purpose,—or 100,000 acres out of a total acreage of 106,470,—is under cultivation. Some of the white inhabitants are of the best English stock, being descendants of early settlers who were closely allied by the bond of blood or ties of friendship with the colonists of Virginia. The only foreign journey ever taken by George Washington was in 1752, when he visited this island in company with his invalid brother, Lawrence. The rainfall is abundant, and the climate agreeable, thanks to trade-winds blowing steadily across the Atlantic. Barbados is a colony of England, with its own governor, legislature, etc. In addition to many lesser educational institutions the island has Codrington College, which is affiliated with the University of Durham, England. Its principal city, Bridgetown, headquarters of the Royal Mail Steamship Company, is an attractive place of residence and a favorite resort of tourists. It is also the see of the bishop of Barbados. There is one narrow-gauge railway, and the highways are excellent. The chief and almost the sole industry is the cultivation of sugarcane, to which the soil is peculiarly adapted. Food supplies are imported largely from the United States, to which country nearly the entire sugar product is sent. The value of the annual exports is about \$3,600,000; of the average annual imports about \$5,000,000. Like

BARBADOS CEDAR—BARBAROUX

Guadeloupe and its dependencies, and Désirade and Maria Galante, Barbados is a coral island. Its length is 21 miles, and its width 15 miles. It is situated in lat. 13° 4' N., and lon. 59° 37' W. Consult Stark, 'History and Guide to Barbados.'

MARRION WILCOX,

Authority on Latin-America.

Barba'dos Cedar, a cedar or juniper (*Juniperus barbadensis*) It is found in Florida and the other warm parts of America.

Barbados Cherry, a West Indian shrub or small tree (*Malpighia glabra*) of the natural order *Malpighiaceæ*, with handsome crimson axillary flowers, cultivated to some extent in warm countries for its acid fruit, inferior to but resembling a white cherry. *M. urens* also bears an edible but smaller fruit, and is sometimes also called Barbados cherry.

Barbados Flower Fence, or **Barbados Pride**, the beautiful plant *Poinciana pulcherrima*. It belongs to the leguminous order, and the sub order *Cæsalpinieæ*. It is a low, spiny tree with an odor like savin. It is a native of the tropics of both hemispheres, and in Barbados especially it is used for fence purposes

Barbados Gooseberry, **Blad Apple**, or **Lemon Vine** (*Pereskia aculeata*), a shrubby, slender, tropical American cactus which bears lemon-yellow, smooth, edible pear- or egg-shaped fruits as large as olives. The species is widely used in greenhouses as a stock on which to graft other species of cacti. Its more sturdy relative, *P. bleo*, is similarly used for larger species of cacti.

Barbados Leg, a name frequently applied to the disease called elephantiasis. It is common in Barbados, and is endemic in many tropical and semi-tropical countries. See ELEPHANTIASIS.

Barbados Lil'y, the *Amaryllis equestris*, now called *Hippeastrum equestre*, an ornamental plant from the West Indies.

Bar'bara, **Saint**, virgin and martyr much honored in the Greek and Roman Catholic Churches who is supposed to have flourished in the 3d or early part of the 4th century. Her history has been related by various chroniclers, but with so many discrepancies that it is difficult to ascertain either the events of her life or the circumstances of her martyrdom. According to Jacobus de Voragine, the author of the 'Aurea Legenda,' she was born at Heliopolis, in Egypt, of pagan parents. On arriving at the age of womanhood she was very beautiful, and her father, fearing lest she should be taken from him, confined her in a tower, and in the pictures of this saint the tower is therefore one of her most frequent attributes. In her seclusion she heard of the preaching of Origen, and wrote to him begging for instruction, whereupon he sent one of his disciples, who taught and baptized her. On learning this her father was so incensed that he put her to death. Metaphrastes and Mombritiuss inform us that she was martyred at Heliopolis in the reign of Galerius, and their account agrees with the Emperor Basil's Menology and with the Greek Synaxary. Others again hold that she suffered at Nicomedia, in 235, under Maximian I. Her festival occurs 4 December.

Barbara Allen's Cruelty, an old English ballad preserved in Percy's 'Reliques.' While Barbara's lover, Jemmy Groves, was on his death-bed, her only remark to him was, "Young man, I think you're dying." For this unnatural composure she subsequently endured the pangs of remorse.

Barbara Freitch'ie, the title of a noted poem by Whittier (1863) founded upon an incident reported to have occurred in Frederick, Md., in the Civil War. Recent investigations have thrown some doubt upon the authenticity of the account. A play upon this theme has been written by the dramatist Clyde Fitch

Bar'bara's History, a novel by Amelia Blandford Edwards, published in 1864. It is the romance of a pretty girl, clever and capable, who, passing through some vexations and serious troubles, settles down to an unclouded future.

Barbarelli, **Giorgio**. See GIORGIONE

Barba'rian, a term used by the Greeks to designate a foreigner; one who could not speak Greek. At first the Romans were included by the Greeks under the term barbarian; but as the inhabitants of the great Italian city gradually gained imperial power, and, moreover, began to consider the Greek language a desirable if not even an indispensable part of a liberal education, they were no longer placed in the category of barbarians, nor was their speech deemed barbarous. When the Greeks became the most civilized people in the world, the term barbarian came to be used with some reproach, but less so than among ourselves now.

Barbaros'sa, **Arooj**, or **Horuk**, corsair chieftain, styled "Barbarossa" from his red beard. He was the son of a Greek at Mitylene, and in 1516 assisted Selim, king of Algiers, in driving the Spaniards out of that country. Having taken possession of the capital he put Selim to death and mounted the throne himself. He died in 1518.

Barbarossa, **Khair-ed-Din**, the younger brother and successor of the preceding. He surrendered the sovereignty of Algiers to Selim I, Sultan of Turkey, in exchange for a force of 2,000 janissaries and the title of dey. He was afterward appointed "captain pasha" or high admiral of the Turkish fleet, conquered Tunis, and in 1538 gained a victory over the imperial fleet under the command of Andreas Doria in the Bay of Ambracia. He died in 1546.

Barbaros'sa. See FREDERICK BARBAROSSA.

Barbaroux, bār-ba-roo, **Charles Jean Marie**, celebrated French revolutionist of the Girondin party: b. Marseilles, 6 March 1767; d. Bordeaux, 25 June 1794. At first an advocate and journalist at Marseilles, he was sent by that city to the Constituent Assembly at Paris. There he opposed the Court party and took part with the minister, Roland, then out of favor. After the events of 10 Aug. 1792 he returned to his native town, where he was received with enthusiasm, and was soon after chosen delegate to the convention. In the convention he adhered to the Girondists, and belonged to the party who at the trial of the king voted for an appeal to the people. He boldly opposed the party of Marat and Robespierre, and even directly accused the latter of aiming at the dic-

BARBARY — BARBARY APE

tatorship; he was, consequently, in May 1793 proscribed as a royalist and an enemy of the republic. He fled to Calvados, and thence with a few friends to the Gironde, where he wandered about the country, hiding himself as best he could for about 13 months. At last, on the point of being taken, he tried to shoot himself; but the shot miscarried, and he was guillotined at Bordeaux. He was one of the great spirits of the Revolution. There was no loftier-minded dreamer in the Girondist ranks; hardly a nobler head than his fell in that reign of terror.

Barbary, a general name for the most northerly portion of Africa, extending about 2,600 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 550 miles; comprising Morocco, Fez, Algeria, Tunis, and Tripoli (including Barca and Fezzan). Bordered by the Mediterranean on the north, and by the Sahara on the south, the temperature of this region is generally moderate and remarkably uniform, seldom descending to the freezing-point, and seldom coming up to sultry. From March to September is the dry season, when the ground is frequently so parched as to render walking upon it impracticable. From September to March is the wet season, but the rains are moderate, and almost every day affords a respite of sunshine. The soil is fertile, though sandy and light on the coast, the climate healthy, and agricultural productions are various and abundant. The range of production gives a combination of both tropical and temperate fruits. Agriculture is, nevertheless, greatly neglected. For three centuries the inhabitants of the Barbary states have rendered themselves the pest of human society by their depredations upon the commerce of the seas. Anciently, all Africa was comprehended under two divisions — Egypt and Libya — while Libya was subdivided into northern and southern Libya. North Libya comprised mainly what is now known as the Barbary states. Herodotus says that in his day northern Libya was inhabited by the indigenous race of Libyans and by the foreign Phœnicians and Greeks. These latter settled at various points, from Egypt to Carthage, while the indigenous Libyans occupied from the east to the west, throughout the entire extent. Of the origin of the Libyans, whom Herodotus calls indigenous, we have no trace. Arabian tradition says they colonized Libya from Yemen. The Phœnicians early settled Carthage (860 B.C.) and perhaps the still more western coasts of Mauritania — at least it appears that Carthage was a powerful state at the invasion of Greece by Xerxes. The Cyrenians, who were Greeks, had colonized at Cyrene, just east of the bay of the Mediterranean called Syrtis Major (Gulf of Sidra), in what is now known as Barca. West of Carthage lay Numidia and Mauritania, even to the Pillars of Hercules; east of Cyrene was Egypt; while between these two foreign colonies stretched the narrow coast line, from the Major to the Minor Syrtis, known as Emporia. The rapidly growing Carthaginian power soon extended colonies along the entire coast from the Pillars of Hercules to Grecian Cyrene. The jealousy of Rome was not long in being awakened against so threatening a rival. The history of the Punic wars is well known. At the end of 117 years the Carthaginian power was extinguished, Carthage herself in ruins, and Africa

a Roman province from Mauritania to Cyrenaica. The more complete subjugation of Numidia was accomplished in the Jugurthine war, and that of Mauritania in the reign of Claudius. Thus the territory of the Barbary states, from independent native sovereignties and foreign colonies, had come into the hands of Rome. About 400 A.D. several Teutonic tribes, overrunning Gaul and crossing the Pyrenees, settled in Spain. When, in 428, Boniface revolted against Honorius, the Vandals crossed the Fretum Gaditanum into Africa, led by Genseric, drove out the inhabitants, utterly expelled the Roman power from upper Libya, and reigned 100 years. Then came the struggle under Justinian for the re-establishment of the Roman ascendancy. By Belisarius it was conducted to a successful issue, and northern Africa was united to the eastern empire. For over 300 years this relation continued until about the middle of the 7th century; the Saracens overran Numidia and Mauritania to the Atlantic, and, notwithstanding the disastrous death of their leader Okba, the sceptre of upper Libya passed again from the hands of Rome into that of Arabia. Fifty years later the conquests of Musa and Tarik were pushed across the straits, and a Saracenic empire established in Spain. But the revolution which brought the Abbasides to the caliphate of Arabia and drove the only surviving caliph of the Ommiades into Spain, prepared the way for the independence of the western colonies, and Africa began to throw off the Saracenic yoke (788). A succession of fortunes now attended the states of upper Libya. For eight centuries they were alternately tributary and independent, passing from hand to hand, like the stakes of a faro bank, till in the 16th century the two brothers Barbarossa conquered the whole territory of Numidia and Carthage, and erected the regencies of Algiers and Tunis. A few years later the Turkish Sultan, whose supremacy the younger Barbarossa had acknowledged, erected the pashalic of Tripoli over the ancient Cyrenaica, while in the west there was a gradual consolidation of power into the hands of Mohammed ben Hamed, and his son, who finally established the dynasty of Sherifs in the empire of Morocco, while the French erected, between Morocco and the possessions of the Porte, the regency of Algeria. The religion of the Barbary states is generally Islamism. The European settlers are of course Christians, or Jews, while the blacks, who are slaves, are pagans. There seem to be at present six races or tribes of men inhabiting the Barbary States: (1) The Moors. (2) The Arabs. (3) The Berbers, who are indigenous, and from whom the states probably received the appellation Barbary. (4) The Jews. (5) The Turks, who are the military of the country. (6) The Blacks. The Arabs call the Barbary states *Moghreb* (west). The language of the people inland differs from that of Arabia and Syria, though not so much as on the coast. See ALGERIA; BARCA; FEZZAN; MOROCCO; TRIPOLI; TUNIS.

Barbary Ape, or **Magot**, a small species of ape of the genus *Macacus*, interesting as being the only animal of the monkey kind in Europe. It is found on the rock of Gibraltar, where the individuals are few in number; whence it has been concluded by M. de Blainville that they have sprung from domesticated

BARBARY POWERS

apes escaped from confinement in the houses of Gibraltar. The Barbary magot is a small tailless monkey completely covered with greenish-brown hair. In its wild state it is lively and intelligent, but becomes sullen and intractable in captivity.

Barbary Powers, U. S. Treaties and Wars with the. The four Mohammedan states of Morocco, Algiers, Tunis, and Tripoli, though either independent or nominally tributary to Turkey, were for some three centuries a common foe to Mediterranean commerce and travel. Almost their entire subsistence was on the produce of piracy: either the avails of captured stores, the ransoms for prisoners held in slavery, or the blackmail paid by other powers for immunity. The large states paid them a regular annual tribute,—though by joining forces they could have stopped the piracy at any time,—on the express ground that it gave them the monopoly of Mediterranean trade against the small ones which could not afford it; and England, which paid about \$280,000 a year, deliberately put the price high to prevent others from bidding up to it. Even these sums bought only temporary truce, as the pirate state lived on depredations, and the tribute had to be supplemented with constant presents and concessions. A part of this tribute was always demanded in armed vessels, ammunition and naval stores, so that the civilized powers furnished the means for plundering themselves. The ransom of captives from them was a leading object of public and private charity, and collections were taken up in churches for this end. In 1786 there were 2,200 Christian captives in Algiers alone. When the United States began to send vessels to the Mediterranean no longer protected by the English flag, the pirates at once assailed them; and in July 1785, the Algerines captured 2 vessels and 21 men. Congress appropriated \$80,000 in 1784 to buy immunity after the European model; but it seemed likely to cost nearer \$1,000,000, and, reversing their usual parts, John Adams preferred to pay as a cheaper resort than fighting, while Jefferson considered fighting both cheaper, more honorable, and the preparation for a better future. Morocco, for some reason much the most amenable, signed in 1787 a 50-years' peace without tribute, though with the understanding of some presents to the Sultan, and kept it, save for a short time in 1803. The Dey of Algiers asked \$59,496 for his captives, or over \$2,800 each, though the last French captives ransomed had only cost \$300, or with costs, \$500; and the matter hung fire for several years, 11 of the 21 dying before the final ransom of 1795. In 1793, by the carelessness or bad faith of an English consul, the Algerine corsairs gained entrance to the open sea beyond the Strait of Gibraltar, and captured 10 United States vessels at a blow, the number of our captives in their hands in November being 115. Negotiations were set on foot, and on 5 Sept. 1795 Congress paid Algiers \$992,463.25 for peace and the ransom of all our prisoners—this sum including a 36-gun frigate costing \$99,727, and about \$100,000 worth of stores and ammunition. It also engaged to pay \$21,600 a year thereafter in naval stores, \$20,000 on presentation of a consul, biennial presents of \$17,000, and other regular and incidental gifts. In 1798 it sent four armed vessels as arrears.

A treaty was made with Tripoli in November 1796, on much the same terms save that there were no ransoms; and one with Tunis, in 1799, for \$107,000. The cost of immunities and ransoms in 1802 had been over \$2,000,000; and of course even this bought nothing permanent. The pasha of Tripoli broke the treaty in three years and a half, demanding \$225,000 with \$25,000 annually, and on refusal declared war, 14 May 1801. A squadron under Commodore Dale was sent to the Mediterranean and blockaded Tripoli, also forcing Algiers and Tunis to think better of their threatened alliance with it and to renew their treaties. Morris succeeded him, but was soon recalled. Preble, who took his place, 1803-4, forced Morocco, which had joined Tripoli, to withdraw from the alliance and renew its treaties; carried on a vigorous blockade; and bombarded Tripoli five times. Barron succeeded Preble, but in the middle of 1805 turned over the command to Rodgers, who at once prepared for a grand bombardment and assault. The scale was turned, however, by William Eaton (q.v.), who took up the cause of the pasha's elder brother, Hamet Caramelli, driven from the throne some years before, organized at Alexandria a singular rabble of cosmopolites, and after a desperate six weeks' march across the desert, captured, with the aid of the navy, the seaport of Derne in Barca, several hundred miles east of Tripoli. The pasha feared an insurrection as well as Rodgers' attack; and hastily signed on 3 June 1805, with Tobias Lear, United States consul-general at Algiers, who had come to Tripoli on purpose, a treaty by which the United States paid \$60,000 ransom for the prisoners, left Hamet's supporters to the pasha's vengeance and Hamet himself to beg the United States for a pension, and allowed the pasha four years to deliver up Hamet's wife and children. The need and honor of this abject surrender of our government belongs to historical polemics. The embargo of 1807 prevented further trouble for some years by annihilating our commerce; but after its removal in 1810 the depredations were renewed, and in 1812 Algiers was ready for more gratifications. The dey had received from us \$378,363, but made out a case for \$27,000 arrears, forced the United States consul to borrow it at usurious rates, and then ordering him out of the country, declared war. The War of 1812, however, having denuded the Mediterranean of our trading-vessels, he captured only 1 brig and 11 persons; and after the war our naval force under Decatur was turned against Algiers. He found its entire fleet at sea; captured two and cut off the rest from port; entered the city 30 June 1815, 41 days after sailing; and forced the dey to sign within three hours, without gift or present, on pain of having his city destroyed and his fleet captured, a treaty abolishing all tribute or presents of any sort thereafter from the United States, delivering up all his captives and agreeing that henceforth prisoners of war should not be made slaves, and paying indemnity for the captured brig. Tunis and Tripoli having allowed English ships to seize American prizes in their harbors, Decatur proceeded to both places and forced their rulers to make similar treaties, pay indemnities, and release all their Christian prisoners of whatever nations. This magnificent action of the United States induced the English

BARBASTRO — BARBEL

government to take similar steps the next year, but Tunis and Tripoli did not abandon piracy till 1819, and Algiers was not finally reduced till 1829 by France. It was the United States which first lifted this incubus of "Algerine" (as the entire system was compendiously called) piracy and slavery from the Christian world. See Schuyler, 'American Diplomacy' (1886); Henry Adams, 'History of the United States,' Vols. I., II., IX (1889-90); Felton, 'Life of Eaton,' in Sparks, 'American Biography' See TREATIES; UNITED STATES — DIPLOMACY OF THE.

Barbastro, bār-bā'strō, Spain, a city of Arragon, 30 miles east-southeast of Huesca. The city has straight, well-made, and paved streets, a cathedral with paintings by Galeran, parish church, college, Latin and three other schools, town-house, session-house, ecclesiastical court-house, extensive hospital, two prisons, several convents with churches attached, two palaces, a theatre, and bull-ring. It also possesses philosophical, agricultural, commercial, and other literary and beneficent associations. The manufactures of Barbastro have greatly declined, consisting only of hats, hardware, cutlery, shoes, and ropes; while a little trade is carried on in cattle, horses, and mules. Pop. (1901) 8,300.

Bar'bould, Anna Letitia, English writer, daughter of the Rev. John Aikin. b. Kibworth, Leicestershire, 20 June 1743; d. 9 March 1825. She received from her father a classical education, and early showed a disposition for poetry. Her earliest production was a small volume of miscellaneous poems, printed in 1772, which in the year following was succeeded by a collection of pieces in prose, published in conjunction with her brother, Dr. John Aikin, of Stoke-Newington. In 1774 she married the Rev. Rochemont Barbauld. Her 'Early Lessons and Hymns for Children,' and various essays and poems, have secured for her a permanent reputation. In 1812 appeared the last of her separate publications, entitled 'Eighteen Hundred and Eleven,' a poem of considerable merit; previous to which she had edited a collection of English novels, with critical and biographical notices. A similar selection followed from the best British essayists of the reign of Anne, and another from Richardson's manuscript correspondence, with a memoir and critical essay on his life and writings. She will be longest remembered by her beautiful and much quoted lyric beginning: 'Life, we have been long together.' See Aikin, 'Works of A. L. Barbauld'; Mrs. Thackeray-Ritchie, 'Book of Sibyls' (1883).

Barbazan, bār-bā-zōn, **Arnauld Guilhem, Sire de**, French captain, distinguished by Charles VI. with the title of "Chevalier Sans Reproche," and by Charles VIII. with that of "Restaurateur du Royaume et de la Couronne de France": b. about the end of the 14th century; killed at Bullegneville, 1432. He earned the former of his titles, while yet young, by his successful defense of the national honor in a combat fought in 1404 between six French and six English knights, before the Castle of Montendre; and the latter designation he acquired by his extraordinary exertions on the side of the Dauphin, at a time when the cause of native royalty, powerless in presence of the Anglo-Burgundian league, boasted few adherents.

Barbé-Marbois, bār-bā-mār-bwā, **François, Marquis de**, French statesman: b. Metz, 3 Jan. 1745; d. 14 Jan. 1837. After fulfilling diplomatic offices at several German courts he was sent to the United States as consul-general of France. He organized all the French consulates in this country, in which he resided 10 years, and married the daughter of William Moore, governor of Pennsylvania. In 1785 he was appointed by Louis XVI. superintendent of St. Domingo, and introduced many reforms into the administration of justice and of finance in that island. He returned to France in 1790 and was again employed in German diplomacy. During the excitement of the Revolution he was exiled to Guiana as a friend of royalty, but being recalled in 1801 he was made director of the treasury, a title which he soon exchanged for that of minister. In 1803 he was appointed to cede Louisiana to the United States for \$10,000,000, but had the skill to obtain the price of \$16,000,000, a piece of diplomacy for which he was liberally rewarded by Napoleon. In 1813 he entered the Senate, and the next year voted for the forfeiture of the emperor and the re-establishment of the Bourbon dynasty. He was well received by Louis XVIII., appointed a peer of France and honorary counsellor of the university, and confirmed in the office of first president of the court of accounts, which he had formerly held. He was an object of the indignation of Napoleon after his return to France from Elba, and was ordered to leave Paris. He resumed his offices after the return of the Bourbons, but, moderate in his principles, and an enemy of all reaction, he was not in harmony with the majority of those with whom he associated; and in the Chamber of Peers he succeeded with difficulty in effecting the substitution of banishment for death as a penalty for political offenders. After the revolution of July he exercised the same adulation and took the same oaths of fidelity to Louis Philippe which he had formerly given to Napoleon and the Bourbon princes. The desire to die first President, which had been the motive of all his flexibility, proved at last a vain one, and in 1834 he was succeeded in his office, and as a consolation received the portrait of the king, accompanied by an autograph letter. His numerous works contain curious details concerning St. Domingo, Louisiana, and Guiana, which he studied in his exile, and he wrote also upon the treason of Arnold.

Barbecue, a large gathering of people, generally in the open air, for a social entertainment or a political rally, the leading feature of which is the roasting of animals whole to furnish the members of the party with food. The word is said to have been employed in Virginia prior to 1700, and the institution of the barbecue is of southern origin.

Barbel (*Barbus*), a genus of fresh-water abdominal malacopterygious fishes, of the family *Cyprinidæ*, or carps, distinguished by the shortness of the dorsal and anal fins, a strong spine replacing the second or third ray of the dorsal, and four fleshy filaments growing from the lips, two at the nose and one at each corner of the mouth, and forming the kind of beard to which the genus owes its name. Of the several species, generally named after the country or river where they are found, the European one, com-

BARBER—BARBERRY

mon in most of the rivers of its temperate climates, and hence called *B. vulgaris*, is most deserving of notice. Its average length is from 12 to 18 inches, but individuals have been taken measuring 3 feet, and weighing from 15 to 18 pounds. The head is smooth and oblong, and the upper jaw is much longer than the lower. Its dorsal spine, which is strong and serrated, often inflicts severe wounds on the fishermen and damages their nets. It lives on small fishes, and also on aquatic plants, worms, and insects, which it obtains by boring with its barbels into the banks of the stream and turning up the loose soil. Its flesh is very coarse and unpalatable, and at the time of spawning, the roe is dangerous to eat. Another species, common in the Nile, is described as weighing upward of 70 pounds, and has a flesh which is fine, delicate, and well-flavored. When caught, the fisherman puts an iron through its jaw and fastens it by a short cord to the bank of the river, where it remains alive till required.

Barber, Edward Atlee, American archaeologist: b. Baltimore, Md., 13 Aug. 1851. He was graduated at Williston Seminary in 1869, and was assistant naturalist in the U. S. Geological Survey in 1874-5. Subsequently he was engaged in gold-dredging. His writings include a history of the ancient Pueblos; a large number of magazine articles on ceramics, 'Pottery and Porcelain of the United States'; 'Manual for Collectors of Blue China'; 'Genealogies of the Barber and Atlee Families,' etc.

Barber, Francis, American soldier: b. Princeton, N. J., 1751; d. Newburg, N. Y., 11 Feb. 1783. He graduated at Princeton in 1767, and became principal of a school in Elizabethtown, where Alexander Hamilton was one of his pupils. He was successively major and lieutenant-colonel of the 3d New Jersey artillery, and assistant inspector-general under Baron Steuben. He took part in the battles of Trenton, Princeton, Brandywine, and Germantown, and was severely wounded at Monmouth and in Sullivan's Indian expedition, 1779. He was of the greatest service to Washington in securing intelligence of the enemy's movements and in putting down the mutiny of New Jersey and Pennsylvania troops. In 1781 he commanded a battalion of infantry in Lafayette's Virginia campaign, and was present at Yorktown. He was killed by a falling tree at the close of the war.

Barber, John Warner, American author: b. Windsor, Conn., 1798; d. 1885. He wrote a 'History of New Haven' (1831); 'Incidents of American History' (1847); 'Elements of General History' (1844); and 'Our Whole Country' (1861), etc.; and assisted in compiling the historical collections of New York, New Jersey, Virginia, and Ohio.

Barber, one who shaves beards and dresses hair. The occupation of barber is an institution of civilized life, and is only known among those nations that have made a certain progress in civilization. It is referred to by the prophet Ezekiel: "And thou, son of man, take thee a barber's razor, and cause it to pass upon thine head and upon thy beard." (Ezek. v. 1.) We do not read of a barber at Rome till about the year 454 of the city; but there, as elsewhere, when once introduced, they became men of great notoriety, and their shops

were the resort of all the loungers and newsmongers in the city. Hence they are alluded to by Horace as most accurately informed in all the minute history, both of families and of the state. But in early times the operations of the barber were not confined, as now, to shaving, hair-dressing, and the making of wigs; but included the dressing of wounds, blood-letting, and other surgical operations. It seems that in all countries the art of surgery and the art of shaving went hand in hand. The title of barber-chirurgien, or barber-surgeon, was generally applied to barbers. The barbers of London were first incorporated by Edward IV. in 1461, and at that time were the only persons who practised surgery. The barbers and the surgeons were separated, and made two distinct corporations—in France, in the time of Louis XIV., and in England in 1745. The sign of the barber-chirurgien consisted of a striped pole from which was suspended a basin; the fillet round the pole indicating the riband or bandage twisted round the arm previous to blood-letting, and the basin the vessel for receiving the blood. This sign has been generally retained by the modern barber. In our country, nevertheless, it is only occasionally that the basin may be seen hanging at the door of a barber's shop. The character of the barber is amusingly illustrated in one of the tales of the 'Arabian Nights Entertainments,' and has been immortalized by Beaumarchais, Mozart, and Rossini, under the name of 'Figaro.'

Barber-fish. See SURGEON-FISH.

Bar'ber Poet, The. See JASMIN, JACQUES.

Bar'ber of Seville, The, a five-act comedy by Pierre Augustin Caron (who later assumed the nom de guerre BEAUMARCHAIS). It is the first of the Figaro trilogy, the later plays being the 'Marriage of Figaro' and the 'Guilty Mother.' Upon it have been founded 'Il Barbiere di Liviglia,' an opera by Paisiello (1780), and 'Il Barbiere di Liviglia,' an opera by Rossini, first presented in 1816 and ever since extremely popular.

Barberini, bar-bār-rē'ne, celebrated Florentine family which became powerful through Cardinal Maffeo Barberini, who was elected Pope in 1623 as Urban VIII. Few of the Popes have carried nepotism so far as Urban, who, during his reign of 21 years, seemed intent on only one object, the aggrandizement of his three nephews. Two of them were appointed cardinals, and the third became Prince of Palestrina. The principality of Palestrina continued in the possession of the Colonna branch of the family until 1889, becoming extinct in the male line in that year.

Barberini Faun, a famous piece of Greek sculpture, so called from its having once been in the possession of the Roman family of Barberini. It is now in the Glyptothek at Munich.

Barberini Palace, the residence of the Barberini family in Rome, begun by Pope Urban VIII., its most distinguished member, but not finished till 1640. It contains a famous picture-gallery and a library with over 10,000 volumes and 10,000 MSS.

Bar'berry (*Barberis*), a genus of about 100 species of low ornamental shrubs of the natural order *Berberidaceæ*, natives of temperate climates, sometimes subdivided into species with

BARBERRY BLIGHT—BARBIE DU BOCAGE

simple deciduous leaves (*Berberis*) and species with pinnate persistent leaves (*Mahonia*, q.v.). The yellow flowers are succeeded by red, dark-blue, or black fruit which in some species is used for making jellies of beautiful color and distinct flavor; that of some other species is dried and used like raisins. The yellow roots and sometimes the stems of several species are used in dyeing, and the bark of some in tanning. Many of the species are used for ornament and for hedges, but in wheat-growing sections they should not be planted, because they are host-plants for the æcidium stage of wheat-rust (*Puccinia graminis*), which, however, has been known to develop in localities remote from barberry bushes. *B. vulgaris* and its varieties and *B. thunbergii* (considered by some botanists a form of *vulgaris*) are probably the most common and valuable simple-leaved species planted in America. The former, an American species, is a rather erect shrub about 10 feet tall, with large leaves and racemes of flowers which are followed by red fruits that persist during the winter and even well into the second summer; the latter, a Japanese species, is a low, spreading, graceful shrub with dainty little leaves which become brilliant red in autumn, and with solitary yellow flowers followed by orange-red persistent fruits. The stamens, which in many if not all species are sensitive, spring up when touched. Propagation is usually effected by means of seeds or cuttings of green wood, but sometimes by grafts and layers. For description of species cultivated for ornament in America, consult Bailey and Miller, 'Cyclopedia of American Horticulture' (1900-2).

Barberry Blight or Rust. See RUSTS

Barbers' Itch. Two distinct diseases of the skin are known by this name—one of a parasitic nature, the other not parasitic. In the latter there is an inflammation of the hair follicles characterized by the formation of papules and pustules pierced by hairs. It affects the hairy part of the face and runs a chronic course. It is more inclined to affect the upper lip and upper parts of the face. The more important disease is the *Tinea barbae*, or parasitic disease. Here the hair follicles are infected by a fungus, the *trichophyton*. It is a form of ringworm of the beard. It affects the lower part of the face and neck, causing itching, scaly eruptions that secrete a thick mucus and spread out ring-like from the centre. The disease is always contracted from another person or sometimes from lower animals. Uncleanly barbers' implements are the chief agents in its spread. In the early stages—the parasitic form—it is readily curable, but in the chronic stages it may prove very difficult to treat successfully.

Barberton, Ohio, city in Summit County, 7 miles from Akron, and 39 miles from Cleveland; on the Erie, the Baltimore & Ohio, and the Pennsylvania Railroads. The town was founded in 1803 by O. C. Barber, president of the Diamond Match Company, whose works are located here. It is known as the "magic city" having acquired a population of 7,000 in less than 10 years. It is a progressive manufacturing centre having sewer-pipe mills, rubber works, potteries, iron works, paint mills, salt wells, strawboard works, and other industries. The city is governed by a mayor and city council elected biennially.

Barbès, Armand, bar-bés, àr-môn, French politician and revolutionist. b. Island of Guadeloupe, 1810; d. 1870. At an early age he was taken to France, and in 1830 went to Paris to attend the law classes, where he had an opportunity of manifesting his political opinions at that period of public excitement. During the whole reign of Louis Philippe he was constantly engaged in conspiracies. In consequence of an unsuccessful attempt to overthrow the government he was condemned to death, a sentence which was commuted to perpetual confinement. The revolution of 1848 restored Barbès to liberty. He then founded a club, which took his name, in which the doctrines of socialism were superadded to republicanism. After the insurrection of May 1849, Barbès was sentenced to deportation. In 1854 he was again set at liberty, and left France, a voluntary exile.

Barbet, any of the tropical South American birds of the families *Caprimidae* and *Bucconidae*, both of which are characterized by prominent bristles about the mouth, which assist them in catching flying insects. The birds of the former family are more usually called "thickheads," and those of the latter "puff-birds" (q.v.).

Barbette, bar-bèt', the platform or elevation of earth behind the breastwork of a fortification or an intrenchment, from which artillery may be fired over the parapet. An ascent leads from the interior of the intrenchment to the barbette. When the garrison has much heavy ordnance, or the enemy has opened his trenches, or when it is determined to cannonade the intrenchments of a given point,—as, for example, a bridge or pass,—and the direction of the cannon is not to be materially changed, it is usual, instead of making a barbette, to cut embrasures in the parapet; on the contrary, firing from the barbette is expedient when one expects to be attacked only by infantry, or wishes to cannonade the whole surrounding country. See FORTIFICATION.

Barbette Gun. See ORDNANCE.

Barbette Turret. See TURRET.

Barbey d'Aureville, bar-bā-dō-rě-vē-ye, Jules, French critic and novelist. b. Saint-Sauveur-le-Vicomte, Manche, 2 Nov. 1808, d. Paris, 24 April 1889. As a contributor to the *Pays* in Paris he created a sensation by the unreserved tone and peculiar style of his literary criticisms. He wrote 'On Dandyism and G. Brummel' (1845); 'The Prophets of the Past' (1851); 'Goethe and Diderot' (1880); 'Polemics of Yesterday' (1880); 'Nineteenth Century: The Works and the Men' (1861-92). Of his novels the best are 'The Bewitched' (1854); and 'The Chevalier des Touches' (1864).

Barbiano, bar-byā'nō, Abrechtda, an Italian military officer, who formed the first regular company of Italian troops organized to resist foreign mercenaries, about 1379. This organization, named the "Company of St. George," proved to be an admirable school, as from its ranks sprang many future officers of renown. He became grand constable of Naples in 1384, and died in 1409.

Barbican. See BARBACAN.

Barbié du Bocage, bār-byā-dü-bō-kazh, Jean Denis, distinguished French geographer. b. Paris, 1760; d. there 1825. He laid the found-

BARBIER — BARBOUR

dition of his fame in 1788 by the publication of his beautiful Atlas to the 'Voyage du Jeune Anacharsis,' and was appointed in 1792 keeper of the maps of the Royal Library, and in 1809 professor at the Sorbonne. In 1821 he founded the Geographical Society, of which he became president. He was also a member of the Institute. His maps and plans to the 'Voyage Pittoresque en Grèce, de Choiseul Gouffier,' and to the works of Thucydides, Xenophon, etc., exhibit much erudition. He also prepared many modern maps, and published excellent dissertations in various scientific collections. Although the progress of time has necessarily deprived much of his work of its original value, his labors have not the less given a decided stimulus to the progress of science.

Barbier, bär-byā, Antoine Alexandre, French bibliographer: b. Coulommiers, 1765; d. 1825. In 1794 he went to Paris, where he was chosen a member of the committee appointed to collect works of literature and art existing in the monasteries, which were then suppressed. This was the cause of his being appointed in 1798 keeper of the library of the Conseil d'État, collected by himself, and when it was transported to Fontainebleau in 1807 Napoleon appointed him his librarian. On the return of the king he had the care of his private library. His excellent 'Catalogue de la Bibliothèque du Conseil d'État' (1801-3) is now very rare. His 'Dictionnaire des Ouvrages anonymes et pseudonymes' (1806-9, 4 vols., 3d ed 1824), is, on account of its plan, its accuracy, and its fulness (at least in respect to French literature), one of the best works in this branch of bibliography.

Barbier, Henri Auguste, French poet: b. Paris, 29 April 1805; d. Nice, 12 Feb 1882. Having written a historical novel (1830) with Royer, depicting French mediæval society, he entered his proper sphere, that of poetical satire, in which he obtained a brilliant success with 'The Iambes' (1831; 31st ed, 1882), a series of poignant satires, political and social, lashing the moral depravity of the higher classes,—notably the ignoble scramble for office under the new government, the subject of 'The Quarry,' the most famous among these satires. His next works, 'Lamentation' (1833), bewailing the misfortunes of Italy, and 'Lazarus' (1837), in which he describes the misery of the English and Irish laborer, show a considerable falling off; and in those that followed, the poet of 'The Iambes' is scarcely to be recognized. He was elected to the Academy in 1869.

Barbier, Paul Jules, a prolific French dramatist: b. Paris, 8 March 1825; d. 1901. Having won success with his first effort, 'A Poet' (1847), a drama in verse, he produced 'The Shades of Molière' (1847); 'André Chenier' (1849); 'Willy Nilly,' a comedy (1849); and thereafter in collaboration, mostly with Michel Carré, a number of dramas and vaudevilles, also countless librettos for comic operas. After the war of 1870-1 he published 'The Sharpshooter. War Songs' (1871), a collection of patriotic poems; and later two other volumes of lyrics, 'The Sheaf' (1882) and 'Faded Flowers' (1890); besides 'Plays in Verse' (2 vols, 1879).

Barbier de Seville. See BARBER OF SEVILLE.

Barbiera, bär-byā'ra, Raphael, Italian poet and journalist: b. Venice, 1851. His contributions to periodical literature are particularly valuable, and he has published also several works on Italian literature and numerous anthologies.

Barbieri, Giovanni Francesco. See GUERCINO.

Barbieri, Giuseppe, Italian poet and pulpit orator: b. Bassano, 1783; d. Padua, 1852. He was distinguished for the tasteful eloquence of his sermons.

Barbizon, bar-be-zôn, a village on the skirts of the forest of Fontainebleau; a favorite haunt of artists and tourists which has given its name to a school of French landscape painters. See also BARBIZON SCHOOL.

Barbizon School, the name applied to a school of French artists who settled in the village of Barbizon about 1844. Théodore Rousseau was the earliest of these, and after 1849 Jean François Millet lived in Barbizon; also Corot, Troyon, Diaz, and Daubigny were of this school, and the term came presently to denote those artists who went to nature for inspiration. See MILLET, 'The Painters of Barbizon' (1890). Also see COROT; MILLET.

Barbo'sa, Duarte, Portuguese traveler: b. Lisbon, 1480; d. 1521. He traveled all through India, visited the Molucca Islands, and was Magellan's companion and historiographer in his circumnavigation of the globe. He was murdered by the natives of the island of Cebu.

Barbou, bar'boo, the name of a celebrated French family of printers, the descendants of JOHN BARBOU, of Lyons, who lived in the 16th century. From his press issued the beautiful edition of the works of Clement Marot in 1539. His son, HUGH, removed from Lyons to Limoges, where among other works, his celebrated edition of 'Cicero's Letters to Atticus' appeared in 1580. JOSEPH GERARD, a descendant of the same family, settled in Paris, and continued in 1755 the series of Latin classics in duodecimo,—rivals to the Elzevirs of an earlier date,—which had been begun in 1743, by Coustelier. This series of classics is much prized for its elegance and correctness.

Barbour, bar'ber, Erwin Hinckley, American geologist: b. near Oxford, O. He was assistant palæontologist in the United States geological survey in 1882-8; Stone professor of natural history and geology in Iowa College in 1889-91; became professor of geology in the University of Nebraska, and acting State geologist in 1891; and curator of the Nebraska State Museum in 1892. In 1893 he took charge of the annual Morrill geological expeditions, and since then he has also been engaged in the United States geological and hydrographic surveys.

Barbour, James, American statesman: b. Orange County, Va., 10 June 1775; d. 8 June 1842. He was admitted to the bar when 19 years old. He served in the Virginia legislature 1796-1812, becoming governor of the State in the latter year. Three years later he was elected to the United States Senate. He was secretary of war 1825-7, and minister to England 1828-9. In politics he was strongly anti-Democratic. He was chairman of the convention which nominated Harrison and Tyler for the presidency and vice-presidency.

BARBOUR — BARCELONA

Barbour, John, Scottish poet, of whose life but little is known. He is supposed to have been born about 1316; was educated at Oxford and Paris; and was a clerk in the king's household. He died in Aberdeen, 13 March 1395. His great epic, 'The Bruce,' tells the story of Robert Bruce and the battle of Bannockburn. It was written in 1375 and brought him favor from the king. First printed in Edinburgh in 1571; best modern edition by Skeat (Early English Text Society). He also wrote 'Legends of the Saints,' of 33,533 verses; and a fragment on the Trojan war.

Barbour, John Humphrey, American educator: b Torrington, Conn., 29 May 1854; d. 29 April 1900. He was graduated from Trinity College in 1873, and ordained in the Protestant Episcopal Church in 1878. He was rector of Grace Church, Hartford, till 1889, and then became professor of New Testament literature and interpretation at the Berkeley Divinity School.

Barbour, Oliver Lorenzo, American lawyer: b. Cambridge, N. Y., 12 July 1811; d. 17 Dec. 1889. He received an academical education, and was admitted to the bar in 1832. During 1847-76 he was reporter of the New York court of chancery and the New York supreme court. He compiled a large number of legal digests, treatises on several branches of practice, and annotated editions of Collyer's, Chitty's, and Cowen's works.

Barbour, Philip Pendleton, American jurist: b. Orange County, Va., 25 May 1783; d. 24 Feb. 1841. He studied law at William and Mary College and began to practise in 1802. He led the war party in the Virginia legislature 1812-14, when he was elected to Congress, becoming speaker of the House in 1821. Four years later he was appointed a judge in his native State, returning to Congress in 1827; but later resigning through ill-health. He was subsequently appointed a Federal judge, and in 1836 was promoted to the supreme court of the United States. In politics he was a Democrat.

Barbour, William McLeod, American Congregational clergyman: b. Fochabers, Scotland, 29 May 1827; d. Malden, Mass., 5 Dec. 1899. He was graduated from Oberlin College in 1859, and from Andover Theological Seminary in 1861; was pastor in South Danvers (now Peabody), Mass., 1861-8; professor in Bangor Theological Seminary 1868-77; professor of divinity and college pastor in Yale 1877-87; and became principal and professor of theology in the Congregational College in Montreal, Canada, in 1887-96.

Barboursville, Ky., a town and county-seat of Knox County, 185 miles southeast of Louisville, on the Cumberland River, and the Louisville & N. R. R. The chief industries are mining and lumbering, but oil wells have recently been drilled and the region is being rapidly developed. Pop. (1900) 1,010.

Barboursville, W. Va., a town of Cabell County, situated on the Guyandotte River, and on the Chesapeake & O. and Guyandotte Valley R. R.'s. It is the seat of Barboursville College, a Methodist institution, and is of historic interest as the scene of a Federal victory in the Civil War, 13 July 1861. Pop. (1901) 429.

Barbox Brothers, a short story by Dickens, with a second part known as 'Barbox Brothers & Co.'

Barbuda, bar-boo'da, West Indies, one of the Leeward Islands, belonging to Great Britain. It has a fertile soil, and produces tobacco, cotton, corn, and pepper. There are forts on the west side of the island, and a roadstead, but no port. The population is almost entirely negroes, and numbers less than 1,000.

Barbudo, bar-boo'dō, or **Barbu**, Spanish names in the West Indian region for the strange fishes of the family *Polynemidæ*. See MANGO-FISH.

Bar'by, Prussia, a town in the province of Saxony, on the left bank of the Elbe, 16 miles south-southeast of Magdeburg. It is well built and has an old castle, and manufactures of linen and cotton, soap-works, breweries, and distilleries. Pop. (1900) 5,137.

Bar'ca, a province of northern Africa, lying east of Tripoli, and belonging to Turkey, about 500 miles long by 400 miles wide. It forms a portion of the ancient Cyrenaica, in its widest sense, where the Greeks had two flourishing colonies. The Greeks were followed in possession of the country by the Romans, and the monuments of both peoples remain in the ruins of their cities. The sides and summits of the hills in the east and north are fertile, and yield abundant crops and excellent pasture. The loftiest heights do not exceed 1,800 feet. Flowering shrubs occur in great variety, including among others, roses, laurestinas, honeysuckles, etc. The Bedouin inhabitants have numerous camels and other cattle, constituting their principal wealth. Among beasts of prey the most common are hyenas and jackals; noxious insects also abound. There are hardly any permanent streams, most of the water-courses being of the nature of mountain torrents, which lose themselves in the sands of the Libyan Desert. The eastern portion, however, is tolerably well supplied with water by rains and springs. The chief exports of the country consist of grain and cattle, along with ostrich feathers and ivory, brought by caravans from the interior. Next to Bengazi, the capital, the seaport of Derna is the chief town. Barca used to form a dependency of Tripoli, but since 1879 has been an independent vilayet of the Turkish empire. The population is variously estimated, but probably does not much exceed 325,000.

Barcarolle, bar'ka-rōl, a song of the gondoliers at Venice, often composed by themselves, to some simple and pleasing melody, such as may be timed to the stroke of the oar. Such melodies are sometimes introduced into operas, and have been written for the piano.

Barcellona, bār-chēl-lo'na, Sicily, a town in the province of Messina, situated on the Soganto River, 27 miles west of the town of Messina. It is noted for its sulphur baths which are frequented from May to September. It has a considerable trade, mostly in oil and fish. Pop. (1901) 23,493.

Barcelo'na, the second largest city of Spain. It is the capital of the province of the same name and of the military department of Catalonia, and is handsomely built, in the shape of a half-moon, on the coast of the Mediterranean, between the mouths of the Llobregat and the Besos. It was, even in the Middle Ages, one of the principal commercial places on this sea; is fortified; and has on the east side a

BARCELONA — BARCLAY

strong citadel, built in 1715. On the west lies the hill of Monjuich, with a fort which protects the harbor. Barcelona is divided into an upper and lower town, and contained, including the adjoining Barcelonetta, 509,589 inhabitants in 1897. Its manufactures are the most important in Spain. The principal are cottons, silks, woollens, machinery, iron castings, paper, glass, mathematical instruments, chemicals, stoneware, soap. There are also dyeworks, tanneries, etc. The harbor is spacious, and has an entrance 300 yards wide between two long piers. The entrance is protected by a large mole, which has been recently extended, and there is a large dry-dock. The exports largely consist of manufactured goods, wine and brandy, fruit, oil, etc. The so-called Barcelona (hazel) nuts are not exported from Barcelona, but from Tarragona. The city contains a university (in a noble pile of buildings begun in 1872), several libraries, a museum, a school for engineers and artillery, an academy of belles-lettres, a foundling hospital, a general hospital, large enough to contain 3,000 sick persons, a deaf-and-dumb institution, a large arsenal, a cannon foundry, several large theatres, a cathedral dating from the 13th century. It is altogether a beautiful and agreeable town, with various interesting features and highly picturesque surroundings. Electric lights and electric tramways have been introduced. Barcelona was an important city from a very early date, and was from the 9th till the 12th century governed by its own counts; but afterward by the marriage of Raymond IV. with the daughter of Ramiro II, king of Aragon, it was united with that kingdom. In 1640 it withdrew, with all Catalonia, from the Spanish government, and submitted to the French crown; in 1652 it submitted again to the Spanish government; in 1697 it was taken by the French, but restored to Spain at the Peace of Ryswick. In the war of the Spanish Succession Barcelona took the part of the Archduke Charles; but in 1714 was besieged by the troops of Philip V., under the command of the Duke of Berwick, and taken after an obstinate resistance. The strong citadel on the east side of the city was then erected to overawe the inhabitants. On 16 Feb. 1809, Barcelona was taken by surprise by the French troops under Gen. Duhesme, and remained in the power of the French till, in 1814, all their troops were recalled from Catalonia to defend their own country. In 1821 the yellow fever carried off 40,000 of the inhabitants. The city has been the scene of many serious and sanguinary revolts, particularly in 1832, 1836, 1840, and 1841. Later, industry and commerce have rapidly increased, the construction of railways contributing to this result. This city is regarded as the centre of anarchist movements in Spain.

Barcelona, Venezuela, the capital of a district and of the State of Bermudez, near the mouth of the Neveri, 160 miles east of Caracas. The surrounding country is fertile, but the city is very unhealthy. Cattle, jerked beef, hides, indigo, cotton, and cacao are the chief exports. Pop. (1900) about 13,000. The district, formerly a separate state, has since 1881 formed one of the divisions of the State of Bermudez.

Barchester Towers, a novel by Anthony Trollope. It is the second of the eight volumes comprised in his 'Chronicles of Barssetshire,' and is a study of social life in the clerical circle centring at the episcopal palace of Barchester.

Barclay, Alexander, English, or more probably Scottish, poet: b. about 1475; d. 1552. Very little is known concerning him except from his writings, which inform us that he was a priest and chaplain at St. Mary Ottery, in Devonshire, and afterward a Benedictine monk of Ely. His principal work is a satire, entitled 'The Shyp of Follys of the Worlde,' a free translation of a German composition. Barclay also wrote Eclogues, which are curious and interesting for the descriptions they afford of the characters and manners of the age.

Barclay, James, Canadian educator: b. Paisley, Scotland, 19 June 1844. He was licensed by the Paisley Presbytery in 1870; and was called to St. Paul's Church, in Montreal, in 1883. While in Scotland he was frequently summoned to Balmoral to preach before Queen Victoria. He served through the Riel rebellion in the Northwest Territories, in 1885, and, besides being connected with various local institutions, has been president of Trafalgar Institute since its opening.

Barclay, John, Scottish poet: b. Pont-à-Mousson, France, 1582; d. 1621. He accompanied his father to England, where he was much noticed by James I., to whom he dedicated a politico-satirical romance, entitled 'Satyrikon,' in Latin, directed against the Jesuits. He wrote also several other works, among which is a singular romance, in elegant Latin, entitled 'Argenis,' which first appeared at Paris in 1621. It is an allegory, of a character similar to that of Satyrikon, and alludes to the political state of Europe, and especially France, during the league. Like the earlier work, it has been several times reprinted, and has also been translated into several of the modern languages, including English.

Barclay, John, Scottish anatomist. b. Perthshire, 1760; d. Edinburgh, 1826. He studied divinity and was licensed as a preacher at Dunkeld. In 1789 he commenced the study of anatomy, and graduated in 1796, when he visited London and studied under Dr. Marshall. On his return to Edinburgh in 1797, he gave lectures on anatomy. He published several works on subjects connected with the sciences of medicine and surgery; he also made some efforts toward reforming the system of nomenclature then in use among anatomists. He bequeathed his valuable anatomical collection to the Royal College of Surgeons of Edinburgh, where it is known as the Barclayan Museum. He published 'Description of the Arteries of the Human Body' (1812).

Barclay, Robert, a distinguished member of the Society of Friends: b. 23 Dec. 1648, at Gordonstown, in the County of Moray, of an ancient and honorable family; d. 3 Oct. 1690. The troubles of the country induced his father, Col. Barclay, to send him to Paris, to be educated under the care of his uncle, who was principal of the Scots College in that capital. Under his influence he was easily induced to become a convert to the Roman Catholic religion, upon which his father sent for him to return home; and Col. Barclay soon after becoming a Quaker, his son followed his example. Unitng all the advantages of solid learning to great natural abilities, he soon distinguished himself by his talents and zeal in the support of his new opinions. His first treatise in support of

his adopted principles was published at Aberdeen in the year 1670, under the title of 'Truth Cleared of Calumnies,' etc. To propagate the doctrines, as well as to maintain the credit he had gained for his sect, he published, in 1675, a regular treatise, in order to explain and defend the system of the Quakers, which production was also very favorably received. These and similar labors involved him in controversies with the leading members of the University of Aberdeen, and others; but he was at the same time busy with his great work in Latin, 'An Apology for the True Christian Divinity, as the Same is Preached and Held Forth by the People in Scorn Called Quakers,' published at Amsterdam in 1676; an English translation appeared later in the same year. He traveled with William Penn and George Foxe through the greater part of England, Holland, and Germany, to spread the opinions of the Quakers. The last of his productions, in defense of the theory of the Quakers was a long Latin letter addressed, in 1676, to Adrian de Paets, 'On the Possibility and Necessity of an Inward and Immediate Revelation.' It was not published in England until 1686. With few exceptions, both partisans and opponents unite in the profession of great respect for the character and talents of Barclay. Besides the works already mentioned or alluded to, he wrote 'Catechism and Confession of Faith' (1673); 'Theses Theologiæ' (1675), of which the Apology was a defense; 'The Anarchy of Ranters' (1676); 'Universal Love Considered and Established Upon Its Right Foundation' (1677); and various replies to the most able opponents of his Apology. In 1692 a collected edition of his works appeared under the title 'Truth Triumphant.' It was republished in 1717-18.

Barclay-Allardice, Robert, known as Capt. Barclay, the pedestrian: b. 1779; d. 8 May 1854. He entered the army (1805), and served in the Walcheren expedition (1809), but afterward devoted himself to agriculture, cattle-breeding, and the claiming of earldoms (Airth, Strathearn and Menteith). His feat of walking 1,000 miles in 1,000 consecutive hours took place at Newmarket, in June and July, 1809.

Barclay de Tolly, Michael, Prince, distinguished Russian general: b. Livonia, 1761; d. Insternburg, 14 May 1818. He entered the army at an early age, and his long service as a subordinate in campaigns against the Turks, Swedes, and Poles, laid the basis of a valuable experience, and served to develop his great natural capacity for command. In 1810 he was named minister of war. He occupied this position in 1812, when Napoleon invaded Russia, but was soon appointed to the chief command of the army. He adopted a plan of retreat, which was soon seen to be a strict necessity, as the Russian army, officially estimated at more than 500,000, did not greatly exceed 100,000 men. In this difficult campaign Barclay proved no unworthy opponent of Napoleon himself. Notwithstanding, the Russians became impatient of a policy which seemed to show no active results, while jealousy of the Scottish extraction of Barclay and other causes completed his overthrow, and after the capture of Smolensk by the French he was superseded by Kutusoff. Serving under his successor, he commanded the right wing of

the Russian army at the battle of Moscow, maintained his position, and covered the retreat of the rest of the army. After the battle of Bautzen, in 1813, at which he again distinguished himself, he was reappointed to the chief command, which he had soon after to resign to Prince Schwarzenberg. He forced the surrender of Gen. Vandamme, who had been detached by Napoleon for some special operations, after the battle of Dresden, and took part in the decisive battle of Leipsic. On crossing the Rhine at the head of the Prussian troops he issued a strict proclamation, forbidding all license on the part of his soldiers, and by the maintenance of an exact discipline he conciliated the French as much as possible to the invaders. He was made a field-marshal in Paris. In 1815 he commanded a mixed corps of continental troops. In this year he received from the emperor the title of prince, and from Louis XVIII. the badge of the order of Military Merit. The Emperor Alexander caused a statue to be erected to him in one of the principal places of St. Petersburg.

Barclay Sound, an inlet on the west coast of Vancouver Island. It is some 35 miles in extent and the Alberni Canal continues it yet farther inland. It contains several islands and iron ore is found along its shores.

Bard, John, American physician: b. near Philadelphia, February 1716; d. 30 March 1799. He was of a family which had fled from France upon the revocation of the edict of Nantes. He practised his profession a few years in Philadelphia, but removed to New York in 1746, where he rose to the first rank among physicians. In 1759, the citizens of New York were alarmed by the arrival of a ship, on board which a malignant fever was raging, and Dr. Bard was appointed to take measures to prevent the disease from spreading. He succeeded in keeping the pestilence within the limits of a temporary hospital, but to guard against similar dangers in future, at his suggestion, Bedloe's Island was purchased, and hospital buildings erected thereon, which were placed under his charge. He continued the practice of his profession to an advanced age, and upon the establishment of the New York Medical Society in 1788, was elected its first president.

Bard, Samuel, American physician: b. Philadelphia, 1 April 1742; d. 24 May 1821. He practised in Philadelphia and New York; organized the medical school of Kings (Columbia) College, and was dean of the faculty; also was president of the New York College of Physicians and Surgeons that succeeded the medical school. He published several works, including 'The Shepherd's Guide' (1807); and a 'Manual of Midwifery' (1807).

Bard, Thomas Robert, American politician: b. Chambersburg, Pa., 8 Dec. 1841. He engaged in railroading in Maryland 1858-64, when he went to California to look after the interests of Col. Thomas A. Scott. Since then he has resided in Ventura County, engaging in wharving and warehousing, banking, sheep grazing, real estate, and petroleum mining. In 1892 he was the only Republican elector for California. He was elected to the United States Senate 7 Feb. 1900 by the unanimous vote of the Republican majority in the legislature.

BARD — BARDOWICK

Bard, a fortress and village in Italy, about 23 miles southeast of Aosta. When the French crossed the St. Bernard, in 1800, the fortress of Bard, manned by 400 Austrians, maintained for 10 days a resistance to their further advance into Italy. Ultimately Napoleon contrived to elude the vigilance of the garrison, and passed by a mountain-track during the night.

Bard, a designation applied to the ancient poets of the Celtic tribes, who, in battle, raised the war-cry, and in peace sang the exploits of their heroes, celebrated the attributes of their gods, and chronicled the history of their nation. Their early history is uncertain. Diodorus tells us that the Celts had bards, who sang to musical instruments; and Strabo testifies that they were treated with respect approaching to veneration. There is a passage in the 'Germania' of Tacitus in which a word occurs that some have read as *barditus*, and translated BARD'S SONG; but *baritus* appears to be the true reading, and the true signification merely WAR-CRY. The first Welsh bards of whom anything is extant are Taliesin, Aneurin, and Llywarch Hen, of the 6th century; but their language is imperfectly understood. From the days of these early representatives of the bards we have nothing further till the middle of the 10th century, when the reputation of the order was increased under the auspices of Howel Dha. A code of laws was framed by that prince, to regulate their duties and fix their privileges. They were distributed into three classes, with a fixed allowance; degrees of rank were established, and regular prize contests, known as *eisteddfods*, were instituted. Their order was frequently honored by the admission of princes, among whom was Llewellyn, last king of Wales. The Britons, kept in awe as they were by the Romans, subsequently harassed by the English, and eternally jealous of the attacks, the encroachment, and the neighborhood of aliens, were, on this account, attached to their Celtic manners. This situation and these circumstances inspired them with a proud and obstinate determination to maintain a national distinction, and preserve their ancient usages, among which the bardic profession is so eminent. Sensible of the influence of their traditional poetry in keeping alive the ideas of military valor and of ancient glory among the people, Edward I. is said to have collected all the Welsh bards, and caused them to be hanged by martial law as stirrers up of sedition. On this incident is founded Gray's well-known ode 'The Bard.' We, however, find them existing at a much later period, but confining themselves to the humble task of compiling private genealogies. But little is known of the music and measures of the bards; their prosody depended much on alliteration; their instruments were the harp, the pipe, and the crwth. Attempts have been made in Wales for the revival of bardism, and the Cambrian Society was formed in 1818, for the preservation of the remains of this ancient literature, and for the encouragement of the national muse. The bardic institution of the Irish bears a strong affinity to that of the Welsh. The genealogical sonnets of the Irish bards are still the chief foundations of the ancient history of Ireland. Their songs are strongly marked with the traces of Skaldic imagination, which still appears among the "tale-tellers," a sort of poetical historians, supposed to be the descendants of the bards. There was, also,

evidently a connection of the Welsh with Armorica. Hence, in the early French romances, we often find the scene laid in Wales; and, on the other hand, many fictions have passed from the Troubadours into the tales of the Welsh. In the Highlands of Scotland there are considerable remains of compositions supposed to be those of their old bards still preserved. Of these, the poems of Ossian, said to be collected and translated by MacPherson, were the most celebrated, but the best authorities have decided that they are spurious.

Bardell', Mrs., the obliging landlady of Mr. Pickwick in Dickens' 'Pickwick Papers,' and the heroine of the famous 'Bardell vs. Pickwick' case.

Bardesanes, bār-dē-sā'nēz, Syrian poet and theologian, who lived in the latter half of the 2d century, in Edessa, and is memorable for the peculiarity of his doctrines. He considered the evil in the world only an accidental reaction of matter, and all life as the offspring of male and female Æons. From God, the inscrutable Principle of all substances, and from the consort of this first Principle, proceeded Christ, the Son of the Living, and a female Holy Ghost; from these, the spirits or created powers of the four elements; thus forming the holy eight, or the godlike fulness, whose visible copies he found in the sun, moon, and stars, and therefore attributed to these all the changes of nature and of human destiny. The female Holy Ghost, impregnated by the Son of the Living, was, according to him, the Creator of the world. The human soul, originally of the nature of the Æons, was confined in the material body only as a punishment to its fall, but not subjected to the dominion of the stars. He considered Jesus, the Æon destined for the salvation of souls, only a feigned man, and his death only a feigned death, but his doctrine the sure means to fill the souls of men with ardent desires for their celestial home, and to lead them back to God, to whom they go immediately after death, and without a resurrection of the earthly body. Bardesanes propagated this doctrine in Syrian hymns, and is the first writer of hymns in this language. The Bardesanists did not formally separate themselves from the orthodox Christian Church, and they maintained themselves until the 5th century. A fragment of the work of Bardesanes upon destiny is preserved in the Greek language, by Eusebius, 'Præpar. Evangel. lib. vi. cap. 103.' He led an irreproachable life.

Bardili, Christoph Gottfried, German metaphysician: b. Blaubeuren, Wurtemberg, 28 May 1761; d. Stuttgart, 5 June 1808. He was distinguished as a critic and opponent of Kant, and philosophically a forerunner of Schelling and Hegel through his exposition and defense of the reality of pure abstract thought as a ground of concrete thinking and being.

Bar'dolph, Shakespearean character. He is one of the dissolute comrades of Falstaff and appears in the plays 'Henry IV.' parts I. and II.; 'Henry V.'; and 'Merry Wives of Windsor.'

Bardowick, bār-dō-vēk, a town in Hanover, once the commercial centre of northern Germany, but now an insignificant village, famous for the ruins of a one time magnificent cathedral, dating from before the destruction of the town in 1189. Pop. (1900) 2,002.

BARDSLEY — BARFLEUR

Bardsley, Charles Wareing, English clergyman and author: b. Keighley, Yorkshire, 1834. He was graduated at Oxford in 1868, and ordained deacon in 1870. His publications include 'English Surnames, their Sources and Significations' (1875); 'John Leeley's Troubles' (1876); 'Memorials of St. Anne's, Manchester' (1876); 'Curiosities of Puritan Nomenclature' (1880); 'Her Grandfather's Bible, a Tale of Furner's Fells' (1886), etc.

Bardwan, *bürd-wān'*, a division of Bengal, upon the Hugli. Area, 13,850 square miles; pop. (1901) 2,245,000. Apart from its products, rice, grain, hemp, cotton, indigo, etc., it has a noted coal field of about 500 square miles in area, with an annual output of about 500,000 tons. The capital of the same name has a population of 34,080.

Barébone, or **Barbon**, *Praise-God*, the name of a leather seller in Fleet Street in London, well known in his day as a prominent preacher among the Baptists: b. about 1596; d. 1679. He made himself notorious as an enemy of the monarchy, and in 1660, on Monk's arrival in London, Barébone, at the head of a numerous mob, presented a petition to Parliament against the restoration of the Stuarts. In 1661 he was committed to the Tower, and remained for some time in confinement.

Barebones Parliament, a derisive term applied to the "Little Parliament" summoned by Oliver Cromwell, 4 July 1653. It consisted of 140 persons, "faithful, fearing God, and hating covetousness," but mostly of very destructive social principles. These began by abolishing the court of chancery, and were proceeding to abolish tithes, to the alarm of the more moderate members, and of Cromwell himself, who dissolved the Parliament on 12 December of the same year. See Gardiner, 'History of the Commonwealth and Protectorate' Vol. II. (1897).

Barefooted Friars. See **FRIARS**.

Barège *bā-rāzh*, a light, open tissue of silk and worsted or cotton and worsted for women's dresses, originally manufactured near Baréges, France, and in that country known as *crêpe de barège*. The fabric is now chiefly manufactured at Bagnères de Bigorre.

Baréges (ancient **VALLETRIA**), a watering place in the south of France, department of the Hautes-Pyrénées, 22 miles south from Tarbes, and celebrated for its thermal springs. It is situated in a valley between two perpendicular chains of mountains, along with numerous other villages. From June to September it is crowded with patients, and the bath establishment is a spacious marble building. A military hospital and an ecclesiastical charity hospital are also prominent local institutions.

Barailly, *bā-rā'le*, a town of Hindustan in the northwest provinces, capital of a district of the same name, 131 miles east-southeast from Delhi. It has a pleasant and elevated site, and contains one well-built street, an old and a new fort, and cantonments in the environs. The principal manufactures are ornamental furniture, sword-cutlery, gold and silver lace, and perfumery. On the outbreak of the Indian mutiny the native garrison mutinied and took possession of the place. It was retaken by Lord Clyde in May, 1858. Pop. (1901) 117,400.

Barentz, William, Dutch navigator: b. about 1560, who discovered Nova Zembla in 1594. While on a third expedition to the same region, in 1596, he discovered Spitzbergen, but had to spend the winter of 1596-7 in Nova Zembla. He and his companions suffered great hardships which led to his death on the homeward journey. Relics of his expedition were discovered undisturbed in 1871.

Barère de Vieuzac, *bā-rār-dě-vyē-zāk*, **Bertrand**, French revolutionist and agitator: b. Tarbes, 10 Sept. 1755; d. 14 Jan. 1841. An advocate of Toulouse, he acted as a deputy in the National Assembly, and was sent by the department of the Hautes-Pyrénées to the National Convention in 1792. He soon became active as a journalist, and attached himself to the *Mountain*, supporting it with eloquence of such a flowery and poetical style as afterward earned him the name of the "Anacreon of the guillotine." He was president of the convention when the sentence was passed upon Louis XVI. He rejected the appeal to the people, and gave his vote with these words: "The law is for death, and I am here only as the organ of the law." Though a supporter of Robespierre, he concurred in his downfall, yet this did not save him from being impeached and sentenced to transportation. His sentence was not carried into effect, and he shared in the general amnesty of the 18th Brumaire. Elected a deputy during the Hundred Days, he was banished after the second restoration. He went to Brussels, where he devoted himself to literary work till the revolution of July permitted his return.

Baretti, *bā-rēt'te*, **Giuseppe Marc' Antonio**, Italian writer: b. Turin 25 April 1716; d. 5 May 1789. In 1753 he published a 'Defence of the Poetry of Italy against the Censures of M. Voltaire.' About this time he was introduced to Johnson, then engaged in the compilation of his 'Dictionary,' of which Baretti availed himself to compile an Italian and English dictionary in 1760, much more complete than any which had hitherto appeared. In this year he revisited his native country, and published at Venice a critical journal, the '*Frusta Letteraria*,' which was soon suppressed. He therefore returned to England, and in 1768 published an 'Account of the Manners and Customs of Italy.' While defending himself in a street brawl he mortally wounded one of his assailants, and was tried for murder at the Old Bailey, but acquitted. On this occasion Johnson, Burke, Goldsmith, Garrick, Reynolds, and Beauclerk gave testimony to his good character. In 1770 he published his 'Journey from London to Genoa through England, Portugal, Spain, and France,' and continued to publish introductory works for students in the Italian and other modern languages, and superintended an edition of Machiavelli's works. His '*Opere Scritte in Lingua Italiana*' appeared at Milan in 6 volumes in 1813-18. Baron Pietro Custodi published his '*Scritti Scelti, Inediti, o Rari*' (1822).

Barfleur, *bār-flēr*, a seaport of France, in the department of La Manche, about 15 miles east of Cherbourg. It was at one time the best port on the coast of Normandy, but in the year 1346 was taken and pillaged by Edward III., king of England, and the harbor destroyed.

BARGE—BARING

William the Conqueror fitted out at Barfleur the expedition which effected the conquest of England. Pop. (1897) 1,189.

Barge, a term commonly applied to flat-bottomed boats such as are used on rivers and canals, the name including various craft, many of them carrying sails and being rigged in several ways. Formerly the name was given to a boat of state or pleasure used chiefly for ornamental purposes, and to the boat of the commanding officer of a ship of war. In eastern New England the name is also given to a kind of open omnibus much used at railway stations and seaside resorts.

Barham, Richard Harris, English humorous writer: b. Canterbury, 6 Dec. 1788; d. 17 June 1845. Having been ordained a clergyman, he became in 1821 one of the minor canons of St. Paul's Cathedral. In 1824 he was appointed a priest in ordinary of the chapel-royal, and was shortly afterward presented to the rectory of the united parishes of St. Mary Magdalene and St. Gregory-by-St. Paul, London. In 1837, on the starting of Bentley's 'Miscellany,' under the editorship of Charles Dickens, he laid the foundation of his literary fame by the publication in that periodical of the 'Ingoldsby Legends'—a series of humorous tales in verse which achieved an immense success, having in a collective form, from 1840 onward, been published over and over again in various editions, with many 'legends' added to the original number. Though a brilliant member of society, and ranking with the most distinguished wits of the day, including his intimate friends, Sydney Smith and Theodore Hook, Mr. Barham never neglected his more serious duties as a clergyman. His life has been written by his son.

Bari, a negro people of Africa, dwelling on both sides of the White Nile. Gondokoro is their chief town. They practise agriculture and cattle-raising. Their country was conquered by Baker Pasha in 1871 for Egypt.

Bari, *bā're* (ancient *BARIUM*), an important seaport of southern Italy, in Apulia, capital of the province Terra di Bari, and situated on a promontory of the Adriatic, 69 miles northwest of Brindisi. It was a place of some importance under the Romans, passed from them to the Saracens, and was afterward selected as the seat of government by the Northmen who conquered Apulia. It has been thrice destroyed and rebuilt on the same site. The present town, surrounded by walls, and defended by a castle, consists of a poorly-built old town with a better part of more recent date. It is the see of an archbishop, and possesses a cathedral with a tower 260 feet high, dating from the early half of the 11th century, but largely spoiled by recent alterations. The church of San Nicola dates from 1087; and there is also a royal lyceum. Bari manufactures cotton and linen goods, organs, pianos, hats, soap, glass, and liquors, and has a trade in wine, grain, almonds, oil, etc. It has regular steamboat communication with Venice, Ancona, Trieste, Brindisi, Genoa, and Marseilles. A United States consul is stationed here. Pop. (1901) 77,478.

Bariatinski, *bār-yā-tēn'skē*, **Alexander Ivanovich**, Prince, Russian field-marshal: b. 1814; d. Geneva, 9 March 1879. He was educated with the future czar, Alexander II., and

while a young officer in the hussars was transferred to the Caucasus, where his successes against the famous Shamyl secured him, in 1852, the rank of lieutenant-general. On the accession of Alexander II. he returned to St. Petersburg, and in 1856 was appointed to the command of the army of the Caucasus. Three successful campaigns were closed by the storming of Ghumb, and the capture of Shamyl. For these services he was made a field-marshal. His health, however, had broken down, and the remainder of his life was passed chiefly abroad.

Barili, *bā-rē'le*, Philippines, a town in the province of Cebu, 52 miles from Cebu, its capital. Pop. (1898) 20,914.

Barilla (Spanish, 'impure soda'), the commercial name of a crude variety of soda obtained by burning certain fleshy plants that grow near the ocean and in other salty places. The *Salsola soda* was largely used for this purpose, and was cultivated in Spain, Sicily, Sardinia, and other places on account of the considerable yield of barilla that it furnished. The plants were cut in September, dried for about a month, and then burned on an iron grating, beneath which was a pit into which the fused ashes fell. The burning was continued until a ton or two of the ash had accumulated in the pit, after which the product was allowed to cool, and was then broken up and shipped to market. Barilla contains about 20 per cent of soda, the remainder consisting chiefly of chlorides and sulphates of sodium, calcium, and aluminum. It was formerly much used in the manufacture of soap, but has now been almost entirely replaced by purer grades of soda, obtained by chemical means from common salt. See KELP.

Bar'ing, the family name of one of the most influential financial establishments in the world, the well-known house of Baring Brothers & Company. John Baring, the father of the founders, was a German cloth maker who engaged in business in a small way at Larkbear, Devonshire, England, in the earlier half of the 18th century. His sons, Francis and John, established the firm of Baring Brothers in London, in 1770. Since 1890 the house has been reorganized as a limited banking company.

Baring, Alexander. See ASHBURTON, ALEXANDER BARING, LORD.

Baring, Sir Evelyn (VISCOUNT CROMER), an English colonial civil servant: b. 1841. He served in the Royal Artillery, became secretary to his cousin, the Earl of Northbrook, one of the controllers-general of Egyptian finance (1879), finance minister of India (1880), and agent and consul-general in Egypt from 1883 onward. He was created a peer in 1892, viscount in 1899, and is author of 'Staff College Essays'; 'The War Game.'

Baring, Sir Francis, English banker: b. Larkbear, England, 1740; d. 1810. He obtained a commercial training, founded a large and successful business, became a director of the East India Company, and was created a baronet in 1793. He took an active part in the discussions relative to the bank restriction act of 1797, and at the time of his death was reckoned the first merchant in Europe.

Baring, Sir Francis Thornhill, English banker, son of Sir Thomas: b. 1796; d. 1866. Under successive Whig governments, he was a

BARING — BARIUM

lord of the treasury, secretary to the treasury, chancellor of the exchequer, and first lord of the admiralty. He was created Baron Northbrook in 1866.

Baring, Sir Thomas, English banker: b. 1772; d. April 1848. He was the eldest son of Sir Francis, whom he succeeded in the baronetcy. He was chiefly remarkable as an admirer and encourager of art. His magnificent collection of paintings was dispersed by public sale after his death. His fourth son, Charles Thomas (1807-79), was bishop of Durham.

Baring, Thomas, English banker and politician, brother of the first Lord Northbrook: b. 1799; d. 1873. He devoted himself early to commercial pursuits, and also to politics, in which he was a Conservative, thus taking the opposite side to his brother. He entered Parliament in 1835, representing the borough of Huntingdon from 1844 till his death.

Baring, Thomas George, second Earl of Northbrook: b. 1826. He was the son of Sir Francis Thornhill, and was successively a lord of the admiralty, under secretary of state for India, under secretary of war, governor-general of India (1872-6), and first lord of the admiralty (1880-5), and was created an earl in 1876. He has published 'The Teachings of Christ in His Own Words.'

Baring-Gould, Sabine, English clergyman and novelist: b. Exeter, 28 Jan. 1834. He graduated from Cambridge in 1856, and since 1881 has been rector of Lew-Trenchard in Devon. He is a voluminous writer of novels and miscellaneous works, among which are: 'Iceland: Its Scenes and Sagas' (1864); 'The Book of Werewolves' (1865); 'Curious Myths of the Middle Ages' (1866-7); 'Lives of the Saints' (1872-9); 'Yorkshire Oddities' (1874); 'Germany, Past and Present' (1879). Prominent among his novels and other later books are: 'Mehalah: a Story of the Salt Marshes' (1880); 'John Herring' (1883); 'Red Spider' (1887); 'Grettit's Outlaw' (1890); 'The Broom Squire' (1896); 'Guavas the Tinner' (1897); 'Bladys' (1897); 'Domitia' (1898); 'Pabo the Priest' (1899); 'A Book of the West' (1899); 'Furze-Bloom' (1899); 'The Crock of Gold' (1899); 'Winefred' (1900); 'A Book of Dartmoor' (1900); 'In a Quiet Village' (1900); 'Virgin Saints and Martyrs' (1900); 'The Frobishers'; 'A Book of Brittany' (1901); 'Royal Georgie' (1901); 'Miss Quillet'; 'Nebo the Nailer' (1902).

Baring Island, an island in the Arctic Archipelago. The name is also given to a bay and strait. They were named for Sir Francis Baring, who was first lord of the admiralty at the time of their discovery.

Baringo, a lake in East Africa, northeast of the Victoria Nyanza, about 20 miles long, 200 square miles in area, and between 3,000 and 4,000 feet above sea-level. Though fed by many streams, it has no visible outlet. It contains several small islands and was discovered by Thomson in 1883.

Barite, *ba'rit* (Greek, "heavy," in allusion to its high specific gravity), a mineral having the formula BaSO_4 , and crystallizing in the orthorhombic system, but also occurring massive, and in granular, earthy, and stalactitic forms. It is usually white or nearly so, and has

a hardness of from 2.5 to 3.5. Its specific gravity ranges from 4.3 to 4.6, and from this circumstance the mineral is often called "heavy-spar." Barite was first examined (in 1602) by Casciorolus, a shoemaker of Bologna, who discovered that it becomes phosphorescent when heated with combustible matter, and gave it the name *lapis solis*, or "sun stone." Barite occurs in many parts of the world, and in large quantities. In the United States it is found abundantly in many States, notably in Virginia, North Carolina, and Missouri, and in the Lake Superior region. It constitutes an important source of barium compounds, and was mined in the United States to the extent of about 61,000 tons in 1902. See also **BARIUM**.

Baritone, or **Barytone**, a male voice, whose compass partakes of those of the common bass and the tenor, but does not extend so far downward as the one nor to an equal height with the other. Its best tones are from the lower A of the bass clef to the lower E or F in the treble; yet we find Verdi and Meyerbeer exacting G and even A flat from it. This name is also given to the smaller bass saxhorn in B flat or C, used in reed and brass bands.

Barium, a metallic element, strongly resembling calcium in its chemical properties. The mineral barite (q.v.) was the first compound of barium to be examined. In 1750 Marggraf showed that barite contains sulphuric acid, and the subsequent labors of Scheele and Gahn proved that it also contains a previously unrecognized earth, which Bergmann called *terra ponderosum*, or "heavy earth." In 1779 Guyton de Morveau proposed the name "barote" (Greek, "heavy") for this earth, and Lavoisier modified the word to "baryta," in which form it still survives. Subsequently baryta was found to be the oxid of a new metal, which was isolated by electrolysis in 1808 by Berzelius and Pontin, and afterward by Davy, and named "barium." The properties of metallic barium are not yet satisfactorily ascertained, for it is probable that the metal has never been obtained in a state of even approximate purity. Thus, Davy says it is a silver white metal; Clarke ascribes to it the color and lustre of iron; Bunsen and Matthiessen describe it as golden yellow; and Donath states that its true color is that of bronze. It oxidizes rapidly in the air, and decomposes water readily. It is ductile and somewhat malleable. Its atomic weight is 137.4 ($\text{o} = 16$), and its chemical symbol is Ba. It melts at about the same temperature as cast iron, and its specific gravity appears to be between 3.75 and 4.00. The most common sources of barium compounds are the carbonate and sulphate, which occur native as Witherite and Barite (qq.v.), respectively. The nitrate is prepared by acting upon the native carbonate with nitric acid. It is a soluble salt, with the formula $\text{Ba}(\text{NO}_3)_2$. The nitrate decomposes upon being strongly heated, the nitric acid being expelled, while barium monoxid (or baryta), BaO , is left behind as a gray, porous mass, strongly caustic and alkaline. When gently heated in air, barium monoxid takes up another molecule of oxygen and forms the dioxid, BaO_2 ; and on being more strongly heated, the dioxid gives up the extra atom of oxygen again, and returns to the monoxid. It was long ago proposed to make use of

BARK — BARK-BEETLES

this curious property for isolating pure oxygen from the air, by alternately heating the dioxid at a high temperature, and collecting the oxygen given off as it returns to the monoxid, and then submitting it, at a lower temperature, to the action of a current of air until it has again passed into the state of dioxid. It was found, however, that the process would work only for a short time, after which a fresh supply of baryta was required. Recent investigations have gone far toward discovering the cause of this loss of activity, and it is now likely that oxygen will soon be made on a commercial scale by this most ingenious process. Baryta absorbs water with considerable evolution of heat and the formation of a hydrate, $\text{Ba}(\text{OH})_2$, which crystallizes with eight molecules of water. Barium hydrate is also made, in large quantities and at a low price, at Niagara Falls, by the electrolysis of soluble salts of barium. The hydrate is used in refining sugar, being much superior to lime for this purpose. With cane sugar it forms an insoluble compound from which the sugar may afterward be set free by a current of carbon dioxid gas. The hydrate is also likely to be of great use, in the near future, for preventing the formation of boiler scale, by precipitating the carbonates and sulphates in the feed water, in the form of insoluble barium compounds. The value of barium hydrate for this purpose has long been known, but until the development of the electrolytic method of manufacturing it, the expense involved was prohibitive. Barium sulphate (barite) is thrown down as a precipitate whenever a soluble barium compound is added to a solution of any sulphate; and for this reason soluble barium salts are much used by the chemist in testing for sulphuric acid and sulphates. The chloride (BaCl_2) is the salt most commonly employed as a reagent for this purpose. Barium sulphate is one of the most insoluble salts known. The native sulphate, when ground up, is used to adulterate white lead. The artificial sulphate is also used for this purpose, and is itself used as a paint, under the name of "permanent white," or *blanc fixe*. The artificial sulphate is said to be superior to the natural mineral for use as a paint, as it has more "body." When barium sulphate is heated with coal it loses its oxygen, and becomes reduced to the sulphid, BaS , a salt which is highly phosphorescent, and is known as Bologna phosphorus. After exposure to sunlight or to a strong artificial light, barium sulphid shines for hours with a bright, orange color. Barium is readily recognized by the spectroscope, by a number of characteristic green lines. Its volatile salts communicate a green color to non-luminous flames, and are used (especially the nitrate) in pyrotechny.

In poisoning by the barium salts the symptoms resemble those seen in poisoning by other metals. In the acute forms there is pain and burning in the mouth and stomach, nausea, vomiting, and chills. These are followed by diarrhoea, dizziness, and chilly feelings. The pulse is slowed, at first large and full, later small and scarcely recognizable. Muscle paralysis supervenes with dyspnoea, loss of consciousness, convulsions, and death. In the treatment prompt washing of the stomach with a solution of Glauber's salts is advisable. This forms an insoluble barium sulphate.

Bark, the more or less easily separable layers of tissue surrounding the woody cylinder of trees and shrubs, also, by extension, the analogous part (cortex) of textile plants such as hemp, jute, ramie, flax, etc., and other annual stems. The layers are divided into three groups which may be readily seen in a yearling stem: (1) The phloem, bast, the inner food-conducting tissue annually thickened from the cambium (q.v.) layer which separates it from the wood; (2) the green zone which generally does not increase in thickness but which in young twigs assists in food elaboration (see PHOTOSYNTHESIS); (3) the epidermis or external layer with contiguous cork cells which increase from the phellogen, or cork cambium, a layer of epidermal or cortical cells. These cork cells which develop mainly at right angles to the direction of the stem, die and become more or less weather-beaten and seamed from cracking and give the characteristic appearance to tree trunks. Many trees can be identified by their bark alone.

The bark of many trees and shrubs is of economic use mainly in tanning, dyeing, medicine, and cookery. In tanning (q.v.) such barks as are rich in tannic acid are most in demand; oak, hemlock, and chestnut (qq.v) are general favorites in America and Europe; eucalyptus and acacia in Australia. Larch and willow bark are used for special work. To obtain these barks the trees are felled after the sap has started to flow in the spring, the rough exterior layers removed, the bark of the trunk and main limbs peeled off in lengths of about two feet with specially made tools; the bark of the smaller branches, in equal lengths, is loosened with mallets and slipped off. After removal the bark is loosely piled in open sheds to dry or stacked on end in the open air, the larger pieces being placed on the outside to protect the smaller inner ones from rain and sun, which together with mildew are the important agencies that may injure the quality of the product. The barks used in medicine, cookery, etc., are treated under individual titles. See CASCARILLA, CINCHONA, and CINNAMON; also CORK.

Bark, or **Barque**, a three-masted vessel whose foremast and mainmast are square-rigged, but whose mizzenmast has fore-and-aft sails only. The distinction between a bark and a barkentine is that the latter has but one mast square-rigged, the main and mizzen being both rigged fore-and-aft.

Bark-beetles, members of the family *Scolytidae*, and allied to the weevils. They are of an elongate cylindrical form, truncated before and behind. They mine under the bark of trees, running their winding galleries in every direction, but rarely attack living healthy trees. They are usually brown or black in color. The rounded head does not end in a snout and is deeply sunken in the thorax; the clavate antennae are somewhat elbowed, while the palpi are very short; the elytra are often hollowed at the end, and the short stout legs are toothed on the under side of the femora, and the tarsi are slender and narrow. The eggs are laid in the bark, whence the larvæ on being hatched bore straight into the sap wood, or mine between the bark and the sap wood. They are fleshy, cylindrical, footless larvæ, wrinkled on the back.

BARK-LOUSE — BARKER

When fully grown in the autumn they gnaw an exit for the beetle, taking care to leave a little space closed in front of their burrow to conceal the pupa. The various species of *Scolytus*, *Tomicus*, and *Xyloterus* give rise to a disease similar to fireblight, by their ravages beneath the twigs of fruit trees, causing the bark to shrivel and peel off as if a fire had run through the orchard. *Xyloterus fuscatus* has been found to bore into empty wine casks and spoil them for use. The spruce forests of Maine and other parts of northern New England have, since 1818, been devastated by *Dendrocotonus piccaperda* of Hopkins. It attacks and kills vigorous trees in perfect health, the largest and best stands of timber suffering most from its ravages. The estimated number of adults which under favorable conditions may emerge from an average-sized tree is from 5,000 to 7,000. Hopkins estimates that an average of three pairs of beetles to the square foot of bark on 10 to 15 feet of the trunk of an average-sized tree are sufficient to kill it, and that 6,000 beetles breeding in one tree may be sufficient to kill from 20 to 25 more trees. Two other beetles (*Polygraphus subpenns* and *Tetropium cinnamopterum*) also aid the *Deudrocotonus* in killing the spruce. Consult: Packard, 'Report on the Insects Injurious to Forest and Shade Trees' (1890); Hopkins, 'Insect Enemies of the Spruce in the Northeast' (Bull. No. 28, Division of Entomology, U. S. Dept. Agriculture, 1891).

Bark-louse, a hemipterous insect of the scale family (*Coccidae*). The bark-lice are very small insects, whose females are wingless, their bodies resembling scales. The females sting the bark of trees with a long slender beak, sucking in the sap, and, when very numerous, injure or kill the tree. The males have two wings but no beak, and take no food. The apple bark-louse (*Mytilaspis pomorum*) is destructive to young apple-trees, while in Florida *M. gloveri* is a pest of the orange, as is also the San José scale-insect (q.v.). The cochineal, the mealy-bug of hot-houses, and various other coccid insects, belong to this group. See SCALE-INSECTS, and the names of various species.

Bark, Peruvian. A bark obtained from several trees belonging to the genus *Cinchona*, which grow spontaneously in many parts of South America, but more particularly of Peru. The trees somewhat resemble a cherry-tree in appearance, and have white or pink flowers. This valuable medicine was formerly called Jesuit's Bark, from having been introduced into Europe by the members of that Order settled in South America. They were instructed in its use by the natives of Peru, and it continued for many years a source of profit to the Order. Its botanical name was derived from that of the Countess del Chinchon, the lady of a Spanish viceroy, who had been cured by it. The tree from which it is obtained grows abundantly in the forests of Quito and Peru, and the bark is cut by the natives in the months of September, October, and November, during which alone the weather is free from rain. The bark is of three kinds—red, yellow, and pale, of which the yellow and pale barks are the stronger in their febrifuge properties. The crown-bark, as the highest-priced is termed, is of a pale yellowish-red. The pale is the original Peruvian cinchona, and is produced by several

varieties of the *Cinchona officinalis*. The red is obtained from the *C. succirubra*, which grows chiefly in the forests of Ecuador around Chimborazo. The yellow sort is produced by the *C. calisaya*, and grows in Bolivia and Peru.

The uses of the bark in medicine are too well known to need description; but the chemical discoveries in relation to it are deserving of more particular mention. Its medicinal properties were found to depend upon the presence of a substance called quinine. This exists, more or less, in all kinds of Peruvian bark, but in quantities very unequal in the various kinds. See QUININE.

Barkal, or **Jebel Barkal**, an isolated sandstone rock, 400 feet high, in Nubia, near the Fourth Cataract of the Nile. It is nearly perpendicular on all sides, but fully so on the side nearest the Nile. There are some remarkable ruins in the vicinity. Excavations here have revealed inscriptions and archæological remains of great interest and value, an account of which may be found in Lepsius's 'Denkmäler,' Vol. V.

Bark'entine. See BARK or BARQUE.

Barker, **Albert Smith**, American naval officer: b. Massachusetts, March 1843. He was graduated at the United States Naval Academy in 1859; served on the frigate Mississippi in the operations to open the Mississippi River in 1861-3, taking part in the bombardment and passage of forts Jackson and St. Philip and the Chalmette batteries, the capture of New Orleans, and the attempted passage of Port Hudson, where his vessel was destroyed. He became captain 5 May 1892; commanded the cruiser Newark during the war with Spain; subsequently succeeded to the command of the battleship Oregon, which he took to Manila; became a rear-admiral, and was placed in command of the Norfolk Navy Yard in 1899; and in July 1900 succeeded the late Rear-Admiral Philip as commandant of the Brooklyn Navy Yard.

Barker, **Edmund Henry**, English philologist: b. Hollym, Yorkshire, December 1788; d. London, 21 March 1839. He undertook the labor of reprinting the 'Thesaurus Græcus' of H. Stephens, upon which was expended an immense amount of time and money, but owing to severe adverse criticisms, the work did not appear in the form which was originally intended, or under his name. His first work, 'Classical Recreations,' appeared in London, 1812; one volume only was published. He also wrote several dissertations, essays, etc., for reviews; a work upon the claims of Sir Philip Francis to the authorship of the Junius letters; a Greek and English dictionary, etc. In the latter part of his life he became so reduced that he was at one time confined in a debtors' prison, and finally died in an obscure lodging-house in extreme want.

Barker, **Fordyce**, American physician: b. Wilton, Franklin County, Me., 2 May 1819; d. 30 May 1891. He entered upon the practice of his profession in Norwich, Conn., in 1845, and made a specialty of obstetrics and diseases of women. After serving as professor of midwifery at Bowdoin, he removed to New York in 1850. He was an incorporator of the New York Medical College and obstetrical

BARKER—BARLAAM

surgeon to Bellevue Hospital, besides acting as consulting physician in leading hospitals. He wrote 'Puerperal Diseases' (1872); and 'On Seasickness.'

Barker, George Frederick, American physicist: b. Charlestown, Mass., 14 July 1835. He was graduated from Sheffield Scientific School, 1858, and Albany Medical College, 1863, and from 1859 to 1872 taught at Harvard, Yale, Wheaton College (Ill.), and Western University of Pennsylvania. Since 1873 he has been professor of physics in the University of Pennsylvania. He was a United States commissioner at the International Electrical Exhibition at Paris, 1881, where he received the Legion of Honor decoration, with rank of commander. He has frequently served as an expert in patent and other cases, notably as a government expert in the suit against the American Bell Telephone Company, and in the Lydia Sherman poisoning case in 1872. His publications have chiefly appeared in the 'American Journal of Science,' 'American Chemist,' and 'Proceedings of the American Philosophical Society.' Others are, besides text-books on chemistry: 'Nitrous-Oxide' (1866); 'Correlation of Vital and Physical Forces' (1871); 'Progress in Physics.' For several years he contributed to the Smithsonian reports.

Barker, Jacob, American financier: b. Swan Island, Me., 7 Dec. 1779; d. Philadelphia, 26 Dec. 1871. He early developed remarkable business ability, settled in New York, and before he was 21 owned five trading vessels and controlled a large credit. In 1801 he met with heavy reverses, but obtaining a government contract for supplying oil, made up his losses, and at the outbreak of the War of 1812, undertook the raising of a loan of \$5,000,000 for the government. He was a founder of Tammany Hall, and a State senator, and established a bank in Wall Street in 1815 which failed in 1819. His financial methods aroused intense opposition and he was once indicted for fraud and convicted, but a new trial quashed the indictment. Removing to New Orleans in 1834, he was admitted to the bar and accumulated a large fortune that was mostly lost during the Civil War. During the latter part of his life he lived in Philadelphia with his son, Wharton Barker. See 'Incidents in the Life of Jacob Barker, 1800-1855' (1855).

Barker, James Nelson, American author: b. Philadelphia, 17 June 1784; d. Washington, March 1858. He served with distinction in the War of 1812, but subsequently entered civil life, becoming mayor of his native city in 1820. He was collector of customs at Philadelphia 1820-38 and during the ensuing 20 years was comptroller of the United States Treasury. His dramatic works, especially 'Marmion,' 'The Indian Princess,' and 'Smiles and Tears,' were popular.

Barker, Lewellys Franklin, Canadian-American anatomist: b. Norwich, Ont., 1867. He was a professor of anatomy at Johns Hopkins University 1894-1900, and from 1900 has been at the head of the department of anatomy in the Rush Medical College of University of Chicago. He is author of 'The Nervous System and Its Constituent Neurons' (1899).

Barker, Matthew Henry, English novelist: b. Deptford, 1790; d. London, 29 June 1846. He followed the sea, and under the name of "The Old Sailor," wrote spirited sea tales, very popular in their day. They include 'Land and Sea Tales' (1836); 'Life of Nelson' (1836); 'Topsailsheet Blocks' (1838; new ed. 1881); and 'The Victory, or the Wardroom Mess' (1844).

Barker's Mill, a form of waterwheel devised by Dr. Barker, some 300 years ago. It turns about a vertical axis, down which the water that is to operate it flows. At the lower extremity of the vertical axis two or more hollow arms project horizontally, like the spokes of a wheel. Water is discharged tangentially from the ends of these hollow arms, and by its reaction causes the wheel to rotate. Barker's mill is now used only as a toy, although a modification of it, invented by Whitelaw, is still used, to some extent, as a source of power in Great Britain, where it is known as the Scotch turbine. See TURBINE.

Barking, England, a town in Essex, on the left bank of the Roding, about two miles above its junction with the Thames, and seven miles northeast from London. The houses are mostly of brick and generally well built. It has a parish church, a handsome structure, with a lofty tower, and some fine public buildings. There are also the ruins of Barking Abbey, at one time among the wealthiest nunneries of England. There are several important industrial works, the largest being a gas works employing many hands. Pop. (1901) 21,500. Consult 'Barking Town' (1897).

Barking Wolf, a name in early American books for the prairie wolf or coyote, on account of the greater resemblance in its voice to the barking of a dog than to the howl of the wolf. See COYOTE.

Bar'kis, a rustic figure in Dickens' 'David Copperfield' He proposes to David's nurse, Peggotty, in the since famous phrase "Barkis is willin'."

Barks'dale, William, American statesman and military officer: b. Rutherford County, Tenn., 21 Aug. 1821; d. 2 July 1863. He was admitted to the bar when under 21, and rapidly achieved eminence in law and politics, editing the Columbus *Democrat*, and serving in the Mexican war. He entered Congress in 1853, but resigned his seat when his State seceded, and took command of a regiment of Mississippi volunteers. He was made a Confederate brigadier-general after a campaign in Virginia, and was killed at Gettysburg.

Barlaam, bār'la-ām, Italian theologian: b. Seminaria, Calabria; d. about 1348. He was a monk of St. Basil, noted for his learning, and particularly for his thorough knowledge of the Greek language. In 1327 he visited Constantinople, and in 1331 he was appointed abbot of the convent of St. Savior. In 1339 the kings of France and Sicily sent Barlaam in vain to Pope Benedict XII. at Avignon, for the purpose of obtaining assistance against the Mohammedans, and of arranging a union between the Greek and Latin Churches. Henceforth he was engaged in various religious controversies, and was defeated in them all. He finally en-

BARLAAM AND JOSAPHAT—BARLEY

tered the Roman Catholic Church, and through the influence of his friend, Petrarch, received from Pope Clement VI. the bishopric of Geraci.

Barlaam and Josaphat, one of the most popular of early mediæval romances, supposed to have been written by St. John of Damascus;—or Damascenus, as he is sometimes called,—a Syrian monk born about the end of the 7th century. The name of Barlaam and Josaphat appear in both the Greek and Roman lists of saints. According to the narrative of Damascenus, Josaphat was the son of a king of India brought up in magnificent seclusion, to the end that he might know nothing of human misery. Despite his father's care, the knowledge of sickness, poverty, and death cannot be hidden from him: he is oppressed by the mystery of existence. A Christian hermit, Barlaam, finds his way to him at the risk of life, and succeeds in converting him to Christianity. The prince uses his influence to promote the new faith among his people. When he has raised his kingdom to high prosperity, he leaves it to spend the remainder of his days as a holy hermit. Professor Max Muller traces a very close connection between the legend of Barlaam and Josaphat, and the Indian legends of the Buddha as related in the Sanskrit of the *Lalit Vistara*. This connection was first noticed, according to Prof. Muller, by M. Laboulaye in the '*Journal des Débats*' (July 1859). A year later, Dr. Felix Liebrecht made an elaborate treatment of the subject. The compilers of the '*Gesta Romanorum*,' Boccaccio, Gower, and Shakespeare have all drawn materials from this romance.

Barlaeus, bār-lē'ūs, or **Bärle**, Kaspar van, Dutch historian and learned writer: b. Antwerp, 12 Feb. 1584; d. Amsterdam, 14 Jan. 1648. His '*Poems*,' mostly Latin, are not forcible, but his '*History of Brazil under Maurice of Nassau*' is decidedly so; and he composed also numerous fine orations, the influence he exercised upon contemporary thought being very considerable.

Barletta, bār-lēt'ta, **Gabriello**, Italian monk. b. perhaps at Barletta, in the kingdom of Naples, in the 15th century. He became celebrated at Naples on account of his sermons, in which he mixed sarcasm and the ludicrous with the sacred: quoting, now Virgil, now Moses; placing David at the side of Hercules; and commencing a sentence in Italian to continue it in Latin, and end it in Greek. Sometimes he forgot himself so far as to use expressions of which he had not considered the signification, as when he asked by what signs the Samaritan knew Jesus was a Jew. Very serious authors, Nicéron and others, have given the response of the preacher; but it cannot be reproduced here. There is under his name a collection of Latin sermons, which have gone through more than 20 editions.

Barletta, Italy, a seaport town on the west shore of the Adriatic, 33 miles northwest of Bari. In the market-place is a colossal bronze statue, about 18 feet high, supposed to represent the Emperor Heraclius. A statue of the statesman Massimo d'Azeglio, who died in 1866, adorns another square. The cathedral is a fine Byzantine edifice, the nave of which is supported by antique granite columns. There are several other churches, convents for both

sexes, an orphan institution, a college founded by Ferdinand IV., and a theatre. The harbor is formed by a mole running out from the shore. It admits of small vessels only, but good anchorage-ground is found in the roadstead. Barletta has a considerable trade in grain, wine, almonds, and the other productions of the country, which are exported to the different ports of the Adriatic. Pop. (1901) 42,022.

Barley (*A. S. baerlic*, from *bere*, barley + *leac*, a leek, plant); genus *Hordeum*; our fourth most important cereal. It belongs to the natural order *Gramineæ* or grass family, and is one of the oldest of the cultivated members of this family. It was cultivated in ancient Egypt (Exod. ix. 31), by the Greeks and Romans. Pliny regarded it as the most ancient food of mankind. It has been found in the lake dwellings of Switzerland in deposits belonging to the Stone Age. Ears of barley are represented plaited in the hair of the goddess Ceres, and are also shown on ancient coins. One of the sacred books of the Chinese claims that it was grown in China 2000 B.C. It grows wild in western Asia, and some authorities regard this as its original home. It is adapted to both warm and cold climates, has a wider range of distribution than any other cereal, being grown all over the region embraced in the temperate zones, from Alaska, Iceland, and Norway in the north to Algeria, Egypt, India, and other sub-tropical countries. The Nepal or Himalaya barley is very hardy, producing good crops at an elevation of 14,000 feet above the sea. In Chile and Switzerland it thrives at 5,000 feet, but on the plateaus of Peru it rarely ripens.

This species is divided into several types, of which the following are recognized: Two-rowed barley, *Hordeum distichon*; four-rowed barley, *H. vulgare*, the common barley, bere or bigg; six-rowed barley, *H. hexastichon*; naked barley, *H. distichon nudum*, the flowering glume and pale not adhering to the grain as in other types; fan, spratt, or Battledore barley, *H. zeocriton*, two-rowed with wide-spreading awns; this is valued in Germany and is sometimes called German rice. These types are further subdivided into varieties, the most popular for malting belonging to the two-rowed type. The best known is the Chevalier, which originated in Suffolk, England, in 1819. This variety and selections from it constitute the high-priced barley of California. In Europe the two-rowed type predominates. In this country the six-rowed is more common. The four-rowed varieties were formerly used for malting; they are hardy and productive but coarse, and are being replaced by the two-rowed. In northern latitudes well-drained and fertile medium or rather light soils, particularly those of a calcareous nature are best. Strong loams, heavy clays, and soils rich in humus, produce heavy crops, but of inferior quality. In southern latitudes medium to heavy loams are best. Climate and season are of more importance than soil in determining whether the barley will be a good malting variety or not. A rather dry climate suits well. The climate of eastern and south-eastern England produces the best malting barley. It may be sown broadcast or drilled, but the latter method is more satisfactory. Fall-sown varieties are handled like fall-sown wheat, but it is generally sown in the spring after

BARLEY BREAK—BARLOW

spring-wheat sowing is over. The amount sown varies from two to three bushels per acre. It germinates quickly, and late spring frosts may injure it. Fertilizers when applied must be evenly distributed or an uneven growth will result. It ripens before spring wheat, and should be fully ripe before it is cut. The color and value of the grain is easily injured by damp weather. From 30 to 40 bushels of grain and 1,500 to 2,200 pounds of straw is a good yield. Sometimes this yield of grain is doubled. A good malting variety must have quick, high, and even germinating power; the grains must be plump, heavy, thin-husked, and uniform in size; of good bright color, not "steely" or bleached, indicating immaturity when cut, nor musty; must contain a high percentage of starch, mealy not flinty, showing that the starch can be readily transformed during malting. Barley is sometimes attacked by rust and smut, but less so than wheat. (See RUSTS; WHEAT.) Wireworms are sometimes troublesome. The production of barley in the United States is increasing. In 1866, 7,916,342 bushels were grown on 492,532 acres. In 1901, 109,932,924 bushels on 4,295,744 acres. The four leading States in 1901 were California, 28,324,410 bushels; Minnesota, 21,680,617 bushels; Wisconsin, 13,419,256 bushels; Iowa, 12,493,368 bushels. The average yield for the 10 years 1892-1901 was 23.24 bushels per acre. The average farm value 40.38c per bushel. In 1901 both Russia and Germany grew more barley than the United States.

Feeding Value and Uses.—The average percentage composition of barley is, water, 10.9; proteids, 12.4; nitrogen-free extract, chiefly starch, 69.8; ether extract, 1.8; crude fibre, 2.7; ash, 2.4. Digestion experiments with pigs showed that 80 per cent of the dry matter, 81 per cent of the protein, 87 per cent of the nitrogen-free extract, and 57 per cent of the ether extract were digestible. Barley is chiefly used for malting, for the preparation of spirits, beer, and malted foods. It is also employed in domestic cookery as "pot or hulled barley" in which only the husks are removed; "pearl barley" is the grain deprived of husk and pellicle, then ground to a round form and polished; "patent barley" is flour obtained by grinding pearl barley. It is used in soups, for making demulcent and emollient drinks for invalids and other purposes. Barley bread is darker in color and less nutritious than that from wheat flour; it does not contain gluten, but is fairly rich in other proteids.

Barley, or decoctions of it, are used to modify cows' milk for feeding to infants. Barley meal and the by-products, barley bean, barley feed (from pearled barley) screenings, malt combs, and brewers' grains are used as stock feeds. Its use for horse feed in the United States is confined to the Pacific coast. For other stock its use is more general. It may be fed alone or with other grain. Barley hay is grown, the crop being cut before the grain is mature. As a forage crop or pasture it may be grown alone or with peas, vetches, or other quick-growing legumes. Barley straw is usually considered as not worth feeding, but may be used as bedding. See MALT.

Barley Break, a game once common, and often mentioned by old English writers. It was played by six young people, three of either

sex, formed into couples, a young man and a young woman in each, it being decided by lot which individuals were to be paired together. A piece of ground was then divided into three spaces, of which the central one was profanely termed hell. This was assigned to a couple as their appropriate place. The couples who occupied the other spaces then advanced as near as they dared to the central one to tempt the doomed pair, who, with one of their hands locked in that of their partner, endeavored with the other to grasp them and draw them into the central space. If they succeeded, they were then allowed themselves to emerge from it, the couple caught taking their places. That the game might not be too speedily finished, leave was given to the couple in danger of being taken to break hands and individually try to escape, while no such liberty was accorded to those attempting to seize them.

Barleycorn, John, a personification of the spirit of barley, or malt liquor. It is commonly used jocularly, and in humorous verse. Dr. Murray's 'Dictionary' quotes a title in the Pepysian Library, about 1620, "A pleasant new ballad . . . of the bloody murder of Sir John Barleycorn." Burns' ballad on John Barleycorn, 'There was Three Kings into the East,' is well known.

Barlow, Francis Channing, American military officer: b. Brooklyn, N. Y., 9 Oct. 1834; d. 11 Jan. 1896. He studied law in New York, and practised there, but in 1861 enlisted as a private in the 12th Regiment, New York State National Guard, which was among the first troops at the front. He was promoted lieutenant after three months of service; colonel during the siege of Yorktown; distinguished himself in the battle of Fair Oaks, or Seven Pines, for which he was promoted brigadier-general, and fought in almost every subsequent battle of the Army of the Potomac. He was severely wounded at Chancellorsville and at Gettysburg, and was mustered out of the service with the rank of major-general of volunteers. In 1866-8 he was secretary of State of New York; in 1871 became attorney-general; and in 1873 resumed law practice in New York.

Barlow, James William, Irish historian: b. 21 Oct. 1826. He was professor of modern history in Trinity College, Dublin, from 1861, and has published 'Lectures on Mediæval Italy'; 'The Normans in Italy'; 'Eternal Punishment or Eternal Death'; 'The Ultimatum of Pessimism.'

Barlow, Jane, popular Irish novelist: b. Clontarf, Ireland, 17 Oct. 1860. The literary quality is a marked characteristic of all her writing. Her published works include 'Bogland Studies,' verse (1892); 'Irish Idylls' (1892); 'Kerrigan's Quality' (1893); 'The End of Elfantown' (1894); 'The Battle of the Frogs and Mice' (1894); 'Maureen's Fairing' (1895); 'Strangers at Lisconnel' (1895); 'Mrs. Martin's Company' (1896); 'Creel of Irish Stories' (1897); 'From the East Unto the West' (1898); 'From the Land of the Shamrock' (1900); 'Ghost-bereft and Other Stories' (1902); 'The Founding of Fortunes' (1902).

Barlow, Joel, American poet and diplomatist: b. Redding, Conn., 24 March 1755; d. near Cracow, Poland, 22 Dec. 1812. In 1774 he was placed at Dartmouth College, New Hampshire,

BARLOW — BARMOTE COURT

and after a short residence entered Yale College, New Haven, where he displayed a talent for versification, which gained him the friendship of Dr. Dwight, then a tutor there. Barlow, more than once during the vacations of the college, served as a volunteer in the army of the Revolution. In 1778 he applied himself to the study of the law, but soon after accepted the position of chaplain in the army, which he held till the close of the war (1783). During this period his songs and addresses were said to have animated and encouraged the soldiers; at this time, too, he planned and partly composed his 'Vision of Columbus.' He went to Hartford, where he started a weekly newspaper, continuing at same time the preparation of his poem for the press. It was published in 1787, and some months after in London. To promote the sale of his poem, and that of a new edition of the Psalms adapted by him, Barlow gave up the newspaper and became a bookseller. In 1788 we find him in France as agent for a number of speculators in land, called the Ohio Company. The Revolution was then in progress, and Barlow went about lecturing and organizing societies in its favor. He went to England in 1791, and was deputed in the following year by the London Constitutional Society to present an address to the French Convention. In 1795 he was appointed American consul at Algiers, a post he only held for two years. Returning to Paris he made some successful commercial speculations and acquired a considerable fortune. He returned, after an absence of 17 years, to his native country (1805). In 1811 he was appointed minister-plenipotentiary to France. In the following year, owing to the fatigues and privations of a journey to Wilna to hold a conference with Napoleon, he died at an obscure village near Cracow. His principal poem, the 'Columbiad,' has never been popular; it is defective in plan and execution, overloaded with philosophical discussions and political tirades; and disfigured by pedantic and uncouth words of his own coinage. His prose writings bear the stamp of an active and energetic intellect, but want that ripeness of judgment required by the complex nature of the subjects he examines. See Todd, 'Life and Letters of Joel Barlow' (1886).

Barlow, Peter, English physicist and mathematician: b. Norwich, October 1776; d. 1 March 1862. He was professor of mathematics in the Royal Military Academy at Woolwich for a period of 40 years. His greatest work is the 'Mathematical and Philosophical Dictionary.' He was also the author of an elaborate work on the 'Machinery and Manufactures of Great Britain' (1837); of a treatise on the 'Force and Rapidity of Locomotives' (1838); and of an 'Essay on Magnetic Attraction,' one of the first works in which the phenomena of magnetism were distinctly enunciated. He invented the Barlow lens.

Barlow, William Henry, English engineer: b. 10 May 1812; d. 14 Nov. 1902. He was educated for the engineering profession, and among his most notable achievements are the St. Pancras terminal station in London and the Tay Bridge, constructed 1880-7. In 1876 he visited the United States as one of the judges of the Centennial Commission. He published 'Illumination of Lighthouses'; 'Diurnal Electric

Tides and Storms'; 'The Resistance of Flexure in Beams'; 'The Logograph.'

Barlowe, Arthur, English navigator: b. about 1550; d. about 1620. In 1584 he was sent with Philip Amidas to select a suitable location for Raleigh's proposed American colony. They explored the coast of North Carolina and on their return to England Barlowe wrote an enthusiastic description of the attractions of the land they had visited.

Barlows Disease. See SCURVY.

Barm. See YEAST.

Bar'mecides, a celebrated Persian family, whose virtues and splendor form a favorite subject for Mohammedan poets and historians. Two eminent members were Khaledben-Barmek, prime minister of Caliph Abul Abbas Al-Saffah, and tutor of the celebrated Haroun al-Raschid, and his son Yahya, grand vizier of Haroun. The expression Barmecides' Feast, meaning a visionary banquet or make-believe entertainment, originates from a story in the Arabian Nights' Entertainments, of a wealthy Barmecide, to whom a poor man, Schacabac, had applied for charity. On the latter informing him that he was starving, the Barmecide invited him to dinner; and calling for a succession of the most sumptuous viands, although none were provided, urged his guest to fall to and enjoy himself, praising the merits of each dish as it was pretended to arrive on the table. Schacabac, though suffering all the pangs of hunger, entered into the eccentric humor of his host, declared his infinite enjoyment of everything set before him, and by his patience so won the heart of his eccentric entertainer, that the latter not only provided for him immediately an actual and plentiful repast, but likewise took him into his house and intrusted him with the management of his affairs.

Barmecides' Feast. See BARMECIDES.

Bar'men, a city on the Wupper, in Rhenish Prussia. The town of Barmen is formed by the union of seven villages contained in the valley of Barmen, from which it takes its name, and its western border adjoins the city of Elberfeld. It is the seat of the Rhenish Missionary Society, which has here a large seminary. The valley is remarkable for natural beauty. The United States has a resident consul. Barmen contains the principal ribbon manufactories on the Continent, and its ribbons are sent into all parts of the world. Next to ribbons the most important textile manufactures are zanellas or Indian cloths, satin for lining, and lace. Barmen also possesses numerous large dye-works, besides manufactures of chemicals, plated and other metal wares, buttons, yarns, iron, machines, pianos, organs, soap, etc. The city has six railway stations, and one of its remarkable features is the electric swinging railway over and along the line of the Wupper between Barmen and Sonnborn. Pop. (1900) 142,000.

Bar'mote Court (from *berg*, hill, and *mote*, meeting), a name given to local courts held in the lead-mining portions of Derbyshire, England. Their purpose is the definition of the ancient rights of the inhabitants, and the settlement of disputes connected therewith. They are of ancient origin, but their scope has been much restricted during the Victorian period.

BARN—BARN SWALLOW

See Bainbridge, 'The Law of Mines and Minerals' (5th ed. 1900).

Barn (Saxon, *berern*, from *bere*, barley, and *ern*, a close place or repository). The word seems originally to have denoted a building for the storing of grain. In modern times it has a wider signification—all structures of any capacity used on a farm for storing crops and sheltering stock being known as barns. In the changeable climate of the United States, with its severe winters, protection to cattle becomes an important item in the operations of husbandry, and as our agriculture becomes more highly developed we construct more expensive, convenient, and useful barns. A well-built barn, embracing all the conveniences needed for the easy and safe storing of crops, and the comfort and well-being of farm stock, will always be one of the safest and best investments a farmer can make. At one time the barns on many estates were capacious enough to contain all the grain raised on them, but recently the practice of stacking grain has gained ground, and it is now considered the better plan—building the grain barn of sufficient size to contain one or two ricks of grain at a time, and all the necessary appurtenances for threshing. The stacked grain is kept in better condition from having a freer circulation of air, and being so disposed as to be free from the attacks of vermin. A regular yard is set apart for stacks, elevated platforms are provided on which the stacks are built, and they are so arranged as to prevent vermin from climbing to them from the ground, and so far separated as to leave each stack isolated. Many such conveniences are known to the American farmer. The skeleton barn, a building but partially enclosed, spaces being left between the boards for the free ingress of air, with a durable roof and projecting eaves, is most used for grain, and for the storing of hay loosely trussed for market. The sheep and stock barns on the continent of Europe are generally of an inferior character, and usually serve also as a residence for the family of the servant or foreman of the farm. The sheep and stock barns of the United States are generally commodious structures, with wide sheds on each side, in which the animals find shelter and receive their provender, or, when built on a side hill, the cellar is appropriated to this purpose. Sheds also surround the whole yard in many instances, while stacks of the poorer quality of hay and threshed straw occupy the centre of the yard, their contents being freely used as bedding and partial food for cattle, the greater bulk finding its way into the manure heap. These are both comfortable quarters for the animals, and profitable for the farmer. Modifications of this general plan are made by each farmer according to his means and peculiar ideas. As a general rule, stock barns are found most profitable when they afford the most ample accommodations. The greater the comfort of his animals, the more uniform the profit of the farmer. Great care should be used in the selection of a place for the farm buildings. The barns should be easily reached, and so arranged as to admit of the economical disposition of both crops and manures. The soil should be dry and porous, or should be thoroughly drained. Ample provision should be made for the saving of manures. Side-hill barns afford cellars in which these

may be kept without waste, their bulk augmented, and those changes produced upon them which are so essential to their highest efficacy. If no good springs, streams, or wells can be obtained, cisterns for rain water should be provided. Barns are usually built of wood, some of stone, a few of brick, and of concrete or gravel wall. The gravel wall can be made cheaper than stone walls, and can be built on farms affording only gravel and small stones of a quality too poor to build ordinary stone walls. Barn doors are usually of wood; and when intended for the threshing or handling of grain should be tight and smooth, and kept clean. Oak, beech, and yellow pine form excellent floors. The threshing floors described by Columella were formed by wetting the earth with the lees of oil, mixing in some chaff, and ramming the whole down firmly; chaff was then trodden on the top, and the whole left to dry in the sun. The lees of oil were said to check vegetation, and drive away vermin. The preparation of corrugated iron, at a comparatively cheap rate of cost, suggests that material as one of the best for a well-built barn. The roof deserves more attention than it usually receives at the hands of the farmer who wishes to be truly economical in his expenditure for buildings. Finally, let all farmers remember that ventilation is one of the most important things to be secured, especially in stock barns.

Barn Owl, a widespread but rather uncommon owl (*Strix flammea*) which seems to be known in all parts of the world, and is everywhere recognizable among other owls by the heart-shaped form of the facial disks, which meet in a point below the beak. These give a very quaint expression, which has led to the soubriquet "monkey-faced" in the southern States. It is about 17 inches in length, and its plumage is yellowish-red, irregularly marked with lighter and darker tints. The eyes are small and black and surrounded by cream-colored disks, bordered with rust-red. The legs are long and bear short feathers only. It is more numerous in the southern part of the United States than in the northerly portion, and is rarely seen even where many exist, since it is more completely nocturnal in its habits than are most owls. It makes its nest in hollow trees or a niche in some rocky cliff or earthen bank, and occasionally nests in belfries or old walls, as is a common habit in Europe. The nest is composed of straw and feathers and the eggs are white. H. K. Fisher, author of 'The Hawks and Owls of the United States' (1893), regards this owl as probably the most beneficial of its tribe to the agriculturist, because in America, at least, it subsists almost entirely upon the small rodents so injurious to crops. This is especially true in the South, where it subsists on the cotton rat and the many harmful mice; while in the West, it catches gophers, ground-squirrels, and rabbits, so that it is entitled to gratitude and protection. The same beneficent service is reported for it in other parts of the world. The American is regarded by many ornithologists as a separate species, *Strix pratensis*.

Barn Swallow, one of the most familiar and wide spread of North American swallows (*Chelidon erythrogaster*). Its plumage is lustrous blue, the forehead, chin, and throat dull

BARNABAS — BARNACLE

chestnut, bounded by a collar-like band of blue across the chest, below which the plumage is pale reddish-brown. By its deeply forked tail it is readily distinguished from the square-tailed cliff-swallow (q.v.), which also throngs about barns, and often is wrongly termed barn swallow; but the latter invariably puts its flask-shaped nests under the eaves outside of the structure, while the true barn swallow invariably nests inside the building. These birds have remarkable wing power, flying for many miles at a time at the rate of more than a mile a minute, with consummate grace and ease; and catching in the air all their food, which consists of winged insects, many of which are injurious or annoying to man, so that their presence is of decided benefit, as well as a pleasant accompaniment of rural life. Before the country was densely populated the swallows made their homes in caves, or in niches of rocks, or hollow trees, but ever since the civilization of the country began, these trustful birds have built their nests close to man's habitation, everywhere frequenting barns and outhouses. Their nest is composed of layers of mud, about an inch thick, plentifully mixed with straw, and lined with feathers. They usually rear two broods a season: the first in May, and the second in July. The eggs are four to six in number, white, with red and purple spots and splashes nearly covering the larger end. When the second brood of young are capable of using their wings, the swallows congregate in flocks of thousands, and migrate southward, traveling by daylight, instead of at night, as is the custom of most migratory birds. In the northeastern part of the country, the barn swallows have been nearly exterminated by the English sparrow, who seize their nest for their own breeding purposes and destroy their eggs and young in a ruthless way, often, apparently, in a spirit of malicious mischief.

Bar'nabas, the surname given by the apostles to Jesus, or Joseph, a fellow-laborer of Paul, and, like him, ranked as an apostle. He is said to have founded at Antioch the first Christian community, to have been first bishop of Milan, and to have suffered martyrdom at Cyprus. His festival is held on 11 June. There is an epistle in 21 chapters ascribed to Barnabas by Tertullian and other early Christian writers, but without any support of internal evidence. It was probably written between 119 and 126 B.C. by some one who was not a Jew, and under the influence of Alexandrian Judaistic thought.

Barnabas, Cape, a headland of Alaska, which the navigator, Capt. Cook, discovered on St. Barnabas Day.

Bar'nabites, a religious order, properly called "Regular Clerks of the Congregation of St. Paul," and deriving the name of Barnabites from their church, dedicated to St. Barnabas, at Milan. Their origin is uncertain, but is supposed to date from the pontificate of Gregory XI. (1370-8). A younger branch was founded during the 16th century, for the purpose of preaching and administering the sacraments among the populace of Milan, who had become much corrupted by the continual presence of a multitude of German soldiers in the city, and who were also much afflicted by pestilence. In 1579 their constitutions and rules were fully

revised and established under the direction of St. Charles Borromeo. They were expelled from France in 1880 and as an order have greatly declined.

Barnaby, Sir Nathaniel, English naval architect: b. Chatham, 1829. From 1855 to 1885 he was engaged in the designing office of the admiralty in the construction of nearly all the British naval vessels. He brought about the substitution of steel for iron in ship-building, and the subsidizing of merchant vessels for use in war. He was made a K. C. B. in 1885.

Barnaby Rudge, a novel by Charles Dickens, published in 1841. The plot is extremely intricate. Some of the most whimsical and amusing of Dickens' character-studies appear in the pages of this novel; while the whole episode of the gathering and march of the mob, and the storming of Newgate is surpassed in dramatic intensity by no passage in modern fiction, unless by Dickens' own treatment of the French Revolution in the 'Tale of Two Cities.' Among the important characters, many of whom are the authors of sayings now proverbial, are Gabriel Varden, the cheerful and incorruptible old locksmith, father of Dolly Varden; Mrs. Varden, a type of the narrow-minded zealot, devoted to the Protestant manual; Miss Miggs, their servant, mean, treacherous, and self-seeking; Sim Tappertit, an apprentice, an admirable portrait of the half-fool, half-knave, so often found in the English servile classes half a century ago; Hugh, the hostler, and Dennis, the hangman; and Grip, the raven, who fills an important part in the story, and for whom Dickens himself named a favorite raven.

Barnacle, Lord Decimus Tite, the name of the nobleman whom Dickens in his 'Little Dorrit' places in charge of the circumlocution office.

Barnacle, a degenerate crustacean, living attached to rocks and the bottoms of ships. The barnacles would at first glance hardly be regarded as Crustacea at all, and were considered to be mollusca, until in 1836, Thompson found that the young barnacle was like the larvæ of other low Crustacea (*Copepoda*). The young barnacle is, as in the common sessile form, a shell-like animal; the shell composed of several pieces or valves with a multivalve, conical, movable lid, having an opening through which several pairs of long, many jointed, hairy appendages are thrust, thus creating a current which sets in toward the mouth. The common barnacle (*Balanus balanoides*) abounds on every rocky shore from extreme high-water mark to deep water, and the student can, by putting a group of them in sea water, observe the opening and shutting of the valves and the movements of the appendages. The structure of the barnacle may best be observed in dissecting a goose-barnacle (*Lepas pascicularis*). This barnacle consists of a body (capitulum) and leathery peduncle. There are six pairs of jointed feet, representing the feet of the cyclops. The mouth, with the upper lip, mandibles, and two pairs of maxillæ, will be found in the middle of the shell. A short œsophagus leads to a pouch-like stomach and tubular intestine. This form, like most barnacles, is hermaphroditic, the ovary lying at the bottom of the shell, or,

BARNACLE-EATER — BARNARD

in the pedunculated forms, in the base of the peduncle, while the male gland is either close to or some distance from the ovary. There is also at the base of the shell, or in the peduncle when developed, a cement-gland, the secretion of which is for the purpose of attaching the barnacle when in the "cypris" stage to some rock or weed.

While the sexes are generally united in the same individual, in the genera *Ibla* and *Scalpellum*, besides the normal hermaphroditic form, there are females, and also males called "complementary males," which are attached parasitically both to the females and the hermaphroditic forms, living just within the valves or fastened to the membranes of the body. These complementary males are degraded, imperfect forms, with sometimes no mouth or digestive canal. The apparent design in nature of their different sexual forms is to effect cross-fertilization. The eggs pass from the ovaries into the body-cavity, where they are fertilized, and remain for some time. They pass through a morula condition, a suppressed gastrula or two-layered state, and hatch in a form called a "Nauplius," from the fact that the free-swimming larva of the Entomostraca was at first thought to be an adult Crustacean, and described under the name of Nauplius. The Nauplius of the genuine barnacles has three pairs of legs ending in long bristles, with a single eye and a pair of antennæ, the body ending in front in two horns, and posteriorly in a long caudal spine. After swimming about for a while, the Nauplius attaches itself to some object by its antennæ, and a strange transformation results. The body is enclosed by two sets of valves, appearing as if bivalved, like a cypris; the peduncle grows out, concealing the rudimentary antennæ, and the feet become smaller, and eventually the barnacle shape is attained. The common barnacle (*Balanus balanoides*) attains its full size after becoming fixed, in one season; that is, between April and November.

Barnacle-eater. See FILE-FISH.

Barnacle Goose. See BERNACLE GOOSE.

Barnard, Lady Anne, Scottish poet, author of 'Auld Robin Gray': b. 1750; d. 26 May 1825. She was the eldest daughter of James Lindsay, fifth Earl of Balcarres, and in 1793 married Andrew Barnard, a son of the bishop of Limerick, and colonial secretary to Lord Macartney at the Cape of Good Hope. There Lady Anne lived till 1807, when, losing her husband, she returned to London, her residence till her death. Her famous lyric was written as early as 1772 to sing to an ancient melody; but she first acknowledged its authorship in 1823 to Sir Walter Scott, who two years later edited it for the Bannatyne Club, with two continuations. Her 'Letters' were published in 1901.

Barnard, Charles, American dramatist: b. Boston, Mass., 13 Feb. 1838. He is a journalist and dramatist. His most popular play is 'The County Fair' (1888). Author of 'The Tone-Masters' (New York 1871); 'Knights of To-Day' (1881); 'The Whistling Buoy' (1887); dramas, and books on gardening and electricity.

Barnard, Mrs. Charlotte Arlington, "CLARIBEL," English composer of songs and ballads: b. 1830; d. 1869. She wrote nearly 100 ballads between 1858 and 1860 under the pseudonym of

Claribel, many of them becoming very popular, "Won't You Tell Me Why, Robin?" and "Come Back to Erin," being especially well known. In most cases she wrote the words for her songs, and she was also the author of a volume of 'Thoughts, Verses, and Songs.'

Barnard, Daniel Dewey, American lawyer: b. Sheffield, Mass., 16 July 1797; d. Albany, N. Y., 24 April 1861. He was admitted to the bar and began practice at Rochester, N. Y., 1821. He was a representative in Congress, 1827-9, and 1839-45, serving as chairman of the Judiciary Committee. From 1850 to 1853 he was minister to Russia. He gave much time to literary pursuits, publishing several addresses and speeches.

Barnard, Edward Emerson, American astronomer: b. Nashville, Tenn., 16 Dec. 1857. He was astronomer in Lick Observatory, California, in 1887-95, and then became professor of astronomy in Chicago University. His principal discoveries are the fifth satellite of Jupiter in 1892, and 16 comets. He has made photographs of the Milky Way, the comets, nebulae, etc. The French Academy of Sciences awarded him the Lalande gold medal in 1892, and the Arago gold medal in 1893, and the Royal Astronomical Society of Great Britain gave him a gold medal in 1897. He is a member of many American and foreign societies, and a contributor to astronomical journals.

Barnard, Frederick Augustus Porter, American educator: b. Sheffield, Mass., 5 May 1809; d. 27 April 1889. He was graduated at Yale College in 1828; instructor there in 1830; professor of mathematics and natural philosophy in the University of Alabama, 1837-48, and afterward of chemistry and natural history till 1854; professor of mathematics and astronomy in the University of Mississippi, 1854-61; its president in 1856-8; and its chancellor in 1858-61. He was president of Columbia College, New York, in 1864-88. In 1860, he was appointed a member of the expedition to observe the eclipse of the sun in Labrador; was engaged in 1862 in reducing observations of the stars in the southern hemisphere; had charge of the publication of charts and maps of the United States Coast Survey in 1863; was named one of the original incorporators of the National Academy of Sciences in 1863; was one of the United States commissioners to the Paris Exposition in 1867; member of the American Philosophical Society, corresponding member of the Royal Society of Liege, and member of many other scientific and literary associations. Among his publications are: 'Letters on College Government' (1854); 'Report on Collegiate Education' (1854); 'Art Culture' (1854); 'History of the American Coast Survey' (1857); 'University Education' (1858); 'Undulatory Theory of Light' (1862); 'Machinery and Processes of the Industrial Arts, and Apparatus of Exact Science' (1868); 'Metric System of Weights and Measures' (1871); 'Recent Progress of Science'; etc. Barnard College, affiliated with Columbia University, was named in his honor.

Barnard, George Grey, American sculptor of eminence: b. Bellefonte, Pa., 24 May 1863. He studied at the Chicago Art Institute and the École Nationale des Beaux Arts, Paris, 1884-7. He first exhibited at the salon of 1894. In 1900

BARNARD — BARNARDO

he received a gold medal at the Paris Exposition. His chief works, largely symbolical in character, are: 'Brotherly Love,' 'The Two Natures' (in the Metropolitan Museum), 'The God Pan' (Central Park), and 'The Hewer.' His studio is in New York.

Barnard, Henry, American educator: b. Hartford, Conn., 24 Jan. 1811; d. 5 July 1900. He was president of the University of Wisconsin (1856-9), and St. John's College, Annapolis, Md. (1865-6); founded the 'American Journal of Education' (1855); was the first United States commissioner of education (1867-70). Among his numerous writings are: 'Hints and Methods for Teachers' (1857); 'Pestalozzi and Pestalozzianism' (1861); 'German Educational Reformers' (1862); etc. In 1886 he began to publish the 'American Library of Schools and Education,' a collection of 800 of his own writings, reports, etc.

Barnard, John, American Congregational clergyman: b. Boston, 6 Nov. 1681; d. 24 Jan. 1770. He was one of the earliest New England dissenters from Calvinism. Ordained colleague minister of Marblehead (1716); he took great interest in the local fisheries and commerce. He wrote 'History of the Strange Adventures of Philip Ashton' (1725), etc.

Barnard, John Gross, American military engineer: b. Sheffield, Mass., 19 May 1815; d. 14 May 1882; brother of F. A. P. Barnard (q.v.). He was graduated at the United States Military Academy in 1833; served from 1835 to 1852 on the coast of the Gulf of Mexico; and was brevetted major in the Mexican war. He subsequently had charge of the fortifications of San Francisco and New York harbors.

Barnard, Joseph Folger, American jurist: b. Poughkeepsie, N. Y., 1823; d. there 6 Jan. 1904. He was graduated from Yale University in 1841; admitted to the New York bar 1844; was elected justice of the State supreme court in 1862, and was re-elected, holding the office until his death.

Barnard College, an educational institution for women in New York, affiliated with Columbia University (q.v.), and founded in 1889. The admission of women to Columbia on the same terms as men had been warmly urged for some years by President F. A. P. Barnard (q.v.), when in 1882 the trustees consented to allow their attendance at the lectures, but declined to grant matriculation or examination. This being found contrary to the statutes of Columbia, on 8 June 1883 a collegiate course duplicating that for the men was opened to women outside the college, but taught by the same instructors, with the same examinations, and rewarded with a degree. The plan was abandoned after five years' trial, and in March 1888 a proposal was made to establish a woman's annex, to be separately financed, but managed under the approval of the trustees of Columbia; the women to pursue the same courses under the same instructors, in such wise as not to interfere with the men's classes, Columbia to appoint the examiners and confer the degrees. This was accepted, and in 1889 the institution was opened under the name of Barnard College, with seven students. Later the rule of common instructors was so far relaxed that

the professors in Barnard were only required to have the approval of Columbia, and since then the deans and some professors have been women; still later, each institution assumed the support of three professorships in the other. After a time certain classes of the senior year and many post-graduate classes were opened to women, subject in all cases to the consent of each professor. The growth of Barnard College rendered these provisional arrangements unsatisfactory, and they were modified by making Barnard formally a part of the Columbia system, 19 Jan. 1900. At present the president of Columbia is *ex officio* president and a trustee of Barnard, while the dean of Barnard controls its internal management and has a vote in the council of Columbia. Barnard, however, remains a distinct institution, separately financed, with its own trustees, and supports a complete undergraduate course. Columbia grants all Barnard degrees as its own, and the Columbia library is free to Barnard students, and certain post-graduate courses are open to members of both institutions. Barnard College received 32 new students during its first year, had doubled the number three years later, and 10 years from its foundation, in 1899, had 41 professors and 308 students, and had graduated 104 in all. Two years later the students had increased to 431. Barnard was started without further resources than a few four-years subscriptions, but speedily attracted donations and endowments which have enabled it to keep pace with its rapidly growing demands. Up to March 1902, it had an endowment of \$250,000; in that month an equal amount was added by John D. Rockefeller, and another \$250,000 was the result of lesser gifts. In March 1903, a gift of \$1,000,000 was made to the college by Mrs. Elizabeth Milbank Anderson, who had previously given Milbank Hall to the institution. Among its buildings are Brinkerhoff Hall, chiefly built from gifts by Mrs. Van Wyck Brinkerhoff; Fiske Hall, given by Mrs. Josiah M. Fiske; and Milbank Hall, given by Mrs. Abram A. Anderson. The first dean of Barnard was Miss Emily James Smith (who subsequently became the wife of George Haven Putnam, the New York publisher), and in 1901 she was succeeded by Miss Laura Drake Gill.

Barnard, Thomas John, English philanthropist: b. Ireland, 1845. He was the founder of the Barnardo Homes for homeless children, having had his attention first turned in this direction by the condition in which he found a boy in a ragged school in east London in 1866. Following up the subject, he began to rescue children who had found their only shelter at night under archways, or in courts and alleys. These were introduced to his homes, where they received an industrial training, were saved from a possible career of crime, and enabled to achieve an honorable position in life. In 1899 over 36,000 boys and girls had passed through the homes; at the same time Dr. Barnardo had under his direction in the United Kingdom and the colonies 24 mission branches and 86 distinct homes dealing with every age and class of needy and destitute childhood, including an immigration depot in Ontario, an industrial farm in Manitoba, a home for babies, and a hospital for sick children. Up to 1899 the number of trained and tested boys and girls who had been placed in colonial situations exceeded 10,000.

BARNATO — BARNES

Barna'to, Barney, or Barnett, South African speculator, whose real name is believed to have been Bernard Isaac: b. London, England, about 1845, of Hebrew parents; d. 14 June 1897. He began business as a dealer in diamonds, and in five years earned enough to buy shares in the Kimberley diamond mines. He established a partnership with Cecil Rhodes, and, when, in 1886, gold was discovered, secured possession of the greater part of the region. He committed suicide by jumping from the deck of the steamer *Scot*, bound from Cape Town to Southampton. See Isaac's 'Life of Barnett Barnato' (1897).

Barnaul, bar-nowl', a mining town of Siberia, in the government of Tomsk, and 230 miles southwest of the town of that name, on the Barnaulski, near its junction with the Obi. It is well built, and the streets are regular and spacious. The chief edifices are of wood. There is a mining-school, an observatory, a public library, a museum, etc. Lead is smelted from the mines in the neighborhood; there are lime and brick kilns, a mint for copper coins, and manufactories. Pop. (1897) 29,408.

Barnave, bär-nāv, Antoine Pierre Joseph Marie, French orator: b. Grenoble, 1761; d. Paris, 29 Nov. 1793. He was chosen a deputy of the *tiers état* to the assembly of the states-general, and showed himself an open enemy to the court. The Constituent Assembly appointed him their president in January 1791. After the flight of the king he defended Lafayette against the charge of being privy to this step, and, upon the arrest of the royal family, was sent, with Petion and Latour-Maubourg, to meet them, and to conduct them to Paris. When the correspondence of the court fell into the hands of the victorious party, 10 Aug. 1792, they pretended to have found documents which showed him to have been secretly connected with it, and he was guillotined. See Salvandy, 'Life of Barnave'; Lamartine, 'History of the Girondists.'

Barnburners, a nickname for the progressive section of the New York State Democracy from about 1844 to 1852, which retaliated by calling the other party "Hunkers." They were essentially the same party which from 1835 onward had favored extension of the canal system, while their opponents were the same who wished it restricted to immediately profitable canals; but under these names the division was on the slavery question (see FREE-SOIL PARTY), in which the Barnburners were the Van Buren or Free-Soil wing. They also stood for the local control by the "Albany Regency," as against the Polk "machine" which the new administration was trying to build up in New York, and which favored the extension of slavery into the Territories. About 1852 the nicknames changed into "Softs" and "Hards," corresponding with new issues to the later "Half-breeds" and "Stalwarts." The origin of the name is usually derived from the familiar campaign story of the man who burned his barn to free it from rats.

Barnby, Joseph, Sir, English composer and organist: b. York, 12 Aug. 1838; d. London, 28 Jan. 1896. He was chorister in York Minster; organist St. Andrew's, Wells Street, London, 1863-71; precentor and choir-master St. Ann's, Soho, 1871; precentor and director of musical instruction in Eton College, 1875, and head of the Guildhall School of Music in London from 1892. His cantatas of "Rebekah," a

sacred idyll, and "The Lord Is King"; numerous highly interesting services and anthems (such as "King All Glorious"), for the Church, as well as several secular choruses and songs, rendered him famous both in England and the United States. He was knighted in 1892.

Bar'negat Bay, a bay on the east coast of New Jersey, about 25 miles in length, and separated from the ocean by Squan and Island beaches. Barnegat Inlet connects it with the Atlantic. On the south side of the inlet is a lighthouse 150 feet high.

Barnes, Albert, American theologian: b. Rome, 1 Dec. 1798; d. Philadelphia, 24 Dec. 1870. Until the age of 17 he was employed by his father, who was a tanner, in his own occupation. At the age of 22 he graduated at Hamilton College, and after studying theology at Princeton was licensed to preach in 1824, and ordained pastor to the Presbyterian Church of Morristown, N. J., in February 1825. In 1830 he was removed to the pastoral charge of the First Presbyterian Church in Philadelphia, where he remained till his death. He is chiefly known by his 'Notes on the New Testament,' published in 11 volumes between 1832 and 1848; and his 'Notes on the Old Testament,' completed in 1870, which are favorite works with Sunday-school teachers and others engaged in biblical tuition. Other works of his are: 'The Church and Slavery' (1857); 'The Atonement in Its Relations to Law and Moral Government' (1859); 'Evidences of Christianity' (1868); 'Life at Threescore and Ten' (1869). He was tried for heresy on account of his belief in unlimited atonement, and though acquitted, the eventual result of the trial was to divide the Presbyterian body in the United States into the Old and New School branches in 1837.

Barnes, Alfred Smith, American publisher: b. New Haven, Conn., 28 Jan. 1817; d. Brooklyn, N. Y., 17 Feb. 1888. He began his career in the book store of D. F. Robinson & Company in Hartford, Conn., removing to New York with the firm. At the age of 21 he formed a connection with Prof. Charles F. Davies and began publishing the latter's mathematical works, personally canvassing for them every State in the country. In 1840 he removed his business to Philadelphia, but returned to New York in 1855. He confined his publications almost exclusively to school text-books. Retiring from active management in 1880 he left five sons to continue the business. At his death he left large bequests to charities and educational institutions.

Barnes, Barnabe, English poet: b. Yorkshire, about 1569; d. Durham, England, December 1609. He was the son of a bishop of Durham; was educated at Oxford; and went to Normandy in 1591 with the Earl of Essex. His fame rests on a collection of sonnets, madrigals, and odes, called 'Parthenophil and Parthenope' (about 1593). Other books of his are: 'A Divine Century of Spiritual Sonnets' (1595); and 'The Devil's Charter,' a tragedy (1607).

Barnes, Charles Reid, American botanist: b. Madison, Ind., 7 Sept. 1858. He was educated at Hanover (Ind.) College, 1877, and pursued graduate studies at Harvard. He held professorships in Purdue University and the University of Wisconsin, 1880-98, and since 1898 has been professor of plant physiology in the University of Chicago. He is the author of

BARNES — BARNEVELDT

'*Outlines of Plant Life*' (1900); joint author of '*Plant Dissection*'; and '*Keys to the Genera and Species of North American Mosses*' (1890). He has contributed many papers to the '*Botanical Gazette*,' of which he has been an editor since 1883.

Barnes, Dame Juliana. See **BERNERS, DAME JULIANA.**

Barnes, James, American soldier: b. Boston, Mass. 1806; d. Springfield, Mass., 12 Feb. 1869. Appointed to West Point from Massachusetts, he graduated there in 1829, standing fifth in a class which included R. E. Lee, J. E. Johnston, and a number of others who afterward became distinguished. Resigning from the army after seven years' service, he became a railroad engineer and built, either wholly or in part, the Rome & W., Sacketts' H. & E., the Buffalo, C. & N. Y., the Terre Haute, A. & St. L., and the Potsdam & W. R.R.'s, between 1848 and 1857. During the Civil War he was colonel of the 18th Massachusetts Volunteers 1861-2, and brigadier-general of United States Volunteers 1862-5. He was present at the battles of Antietam, Fredericksburg, Chancellorsville, and Gettysburg, where he was severely wounded. Exposure and wounds so impaired his constitution that he was unable to engage actively in his profession after the War.

Barnes, James, American author: b. Annapolis, Md., 19 Sept. 1866. He was graduated from Princeton University in 1891, and has been connected in an editorial capacity with '*Scribner's Magazine*' and '*Harpers' Weekly*.' During the Boer war he acted as a correspondent in the field for the '*Outlook*.' His books are: '*Naval Actions of 1812*'; '*For King or Country*'; '*Yankee Ships and Yankee Sailors*'; '*A Loyal Traitor*'; '*The Hero of Erie*' (1898); '*A Princetonian*'; '*David G. Farragut*' (1899); '*Drake and His Yeomen*' (1899); '*Great War Trek with the British Army on the Veldt*' (1901); '*With the Flag in the Channel*' (1902).

Barnes, Joseph K., American surgeon: b. Philadelphia, 21 July 1817; d. Washington, D. C., 5 April 1883. He was educated in the medical department of the University of Pennsylvania; became assistant surgeon in the army in 1840, and served at various posts through the Mexican war. At the beginning of the Civil War he was summoned from Oregon and assigned to duty in the office of the surgeon-general. In 1863 he was appointed a medical inspector, with the rank of colonel, and in September of the same year was promoted to brigadier-general. In 1865 he was brevetted major-general, United States Army. He was surgeon-general of the army from 1864 till 1882, when he was retired.

Barnes, William, English dialect poet and philologist: b. Rushay, Dorsetshire, in 1800; d. 7 Oct. 1886. Of humble birth, he first entered a solicitor's office, then taught a school in Dorchester, and having taken orders became rector of Winterbourne Came in his native county, and died there. He acquired a knowledge of many languages, and published '*An Anglo-Saxon Delectus*'; '*A Philological Grammar*,' grounded upon English; '*Grammar and Glossary of the Dorset Dialect*,' etc., but is best known by his '*Poems of Rural Life*,' in the Dorset dialect, and '*Rural Poems*,' in common English.

Barnesville, Ohio, town in Belmont County, on the B. & O. R.R., 32 miles west of Wheeling. It is the centre of an extensive tobacco and fruit region and has numerous manufacturing factories. It has a national bank, schools, churches and several newspapers. Pop. (1900) 3,721.

Bar'net, or High Barnet, a town of England, in Herts, 11 miles from London. Pop. (1901) 7,900.

Barneveldt, bär'ně-vělt, John van Olden, Dutch statesman: b. 1549; d. 13 May 1619. He early showed himself zealous for the independence of the United Provinces, and as advocate-general of the province of Holland displayed profound views and great skill in business. He preserved his country against the ambition of Leicester; penetrated the secret plans of Maurice of Nassau, whom his fellow-citizens had elevated to the post of stadtholder; and his marked distrust of this prince placed him at the head of the Republican party, which aimed to make the stadtholder subordinate to the legislative power. Spain at that time made proposals for peace through the archduke, governor of the Netherlands. Barneveldt was appointed plenipotentiary on this occasion, and evinced alike the skill of a statesman and the firmness of a republican. Maurice of Nassau, whose interest led him to prefer war, labored to prevent the establishment of peace; and Barneveldt was induced only by the most urgent solicitations of the states to retain the office which had been assigned to him, concluding in 1609 an armistice with Spain for the term of 12 years, in which the independence of Holland was acknowledged. His influence now became still greater, and he was more and more an object of jealousy to the house of Nassau. The hostile spirit of the opposite parties in the state was further increased by theological difficulties. In order to prevent a civil war Barneveldt proposed an ecclesiastical council, which resolved upon a general toleration in respect to the points in question. The states acceded at first to this wise measure, but at a later period the Nassau party persuaded them to adopt other views. This party represented the Arminians as secret friends of Spain. Maurice insisted upon a general synod, with a view, as he pretended, of putting an end to all religious quarrels; but Barneveldt persuaded the states to oppose this measure. Troops were now levied, without the consent of Maurice, to re-establish order in the cities where the Gomarists had excited disturbances. On the other side, the Nassau party redoubled its attacks upon Barneveldt, who, in answer to them, published that celebrated memorial in which he warns the United Provinces of the danger which threatened them from the other party. Maurice, however, procured the assembling of a synod at Dort, in 1618, to which almost all the Calvinistic churches of Europe sent deputies. They condemned the Arminians with the most unjust severity, and Maurice was encouraged by their sentence to adopt violent measures. He caused Barneveldt and other leading men of the Arminians to be arrested; and 26 bribed judges condemned to death as a traitor the man to whom his country owed its political existence. The old man of 72 ascended the scaffold, and

BARNEY — BARNUM

suffered death with the same firmness which he had evinced under all the circumstances of his life. His two sons formed a conspiracy against the tyrant; William escaped, but Reimer was taken and executed. His mother, after his condemnation, threw herself at the feet of Maurice to beg for mercy, and to his question why she humbled herself thus for the sake of her son when she had not done it for her husband, made the memorable reply: "I did not ask pardon for my husband, because he was innocent; I ask it for my son, because he is guilty." See Motley, 'John of Barneveldt' (1874).

Barney, Joshua, American naval officer: b. Baltimore, Md., 6 July 1759; d. 1 Dec. 1818. He was captured by the British in March 1778, but exchanged in August of the same year; was captured again and held a prisoner till he escaped in 1781. In April 1782, he took the British ship General Monk, off Cape May; in November 1782, he carried dispatches to Dr. Franklin in France, and brought back a sum of money lent by the French government. In 1794 he went with Monroe to France, and for six years served in the French navy. In 1814 he commanded the fleet stationed in Chesapeake Bay.

Barnfield, Richard, English poet: b. Norbury, Shropshire, 1574; d. 1627. His lyrics, 'As It Fell Upon a Day' and 'If Music and Sweet Poetry Agree,' were long ascribed to Shakespeare and were included in 'The Passionate Pilgrim' (1599). Barnfield's works include: 'The Affectionate Shepherd' (1594); 'Cynthia, with Certain Sonnets and the Legend of Cassandra' (1595); 'The Encomion of Lady Pecunia' (1598).

Barni, bär-në, Jules Romain, French scholar and critic: b. Lille, 1 June 1818; d. Mers, 4 July 1878. His efforts to propagate the Kantian philosophy through the medium of 'Observations on the Sense of the Sublime and Beautiful' (1836); 'Foundations of Ethical Metaphysics' (1848), and 'Kantian Philosophy' (1850), earned him distinction; as did also, in another, but contiguous field, a 'History of Moral and Political Ideas in France in the Eighteenth Century' (1866).

Barns'ley, England, a town in the west riding of Yorkshire, 23 miles south by east of Leeds. It occupies the summits and slopes of two hills and is well built. Among the chief buildings are the public hall, built at a cost of over £26,000, and furnishing accommodations for various societies; the offices of the miners' association, the Beckett Hospital, the county court, the offices of the Barnsley Banking Company, the parish church, St. George's Church, the Congregational Church, a beautiful edifice, and several other places of worship. Its staple industry is the manufacture of linen in a variety of forms, which is carried on to a great extent, both hand-loom and power-loom being used; linens are also printed here in a style similar to the cottons of Lancashire. There are numerous collieries in the neighborhood, among which the Oaks Colliery has been made memorable by several disastrous explosions. The town possesses a beautiful public park containing several monuments. A United States consul is stationed here. Pop. (1901) 41,000.

Barnstable, Mass., a town, port of entry, and county-seat of Barnstable County, 72 miles

southeast of Boston. Within its corporate limits are 12 villages, several of which, such as Hyannis, Osterville, and Cotuit, are well-known summer resorts. The town has several public libraries and a State normal school. Farming, fishing, and cranberry culture are the principal industries. Pop. (1900) 4,364.

Barnstable, England, a town in Devonshire, 34 miles northwest from Exeter, on the right bank of the Taw, here crossed by a handsome bridge of 16 arches. It is locally styled Barum, and among its public edifices are a large 14th century church, a guildhall, and market buildings, the bridge buildings, Albert clock-tower, etc. Its manufactures consist chiefly of pottery, known as "Barum ware," lace, paper, furniture, toys, leather, gloves, and collars; and ships and boats are built. The trade chiefly depends on the surrounding district. Previous to 1885 the town returned two members to Parliament. Pop. (1901) 14,000.

Barnum, Frances Courtenay (Baylor), American novelist: b. Fayetteville, Ark., 1848. She has written 'On Both Sides,' an international novel (1886); 'Behind the Blue Ridge,' 'Juan and Juanita,' a story for boys and girls; 'Claudia Hyde' (1894); 'The Ladder of Fortune' (1899). She has also been a frequent contributor to magazines, and a writer of short stories. Since her marriage she has lived in Savannah, Ga.

Barnum, Phineas Taylor, American showman: b. Bethel, Conn., 5 July 1810; d. Bridgeport 7 April 1891. He was the son of a tavern-keeper and in his boyhood displayed a remarkable propensity for practical jokes upon his father's customers, as well as a decided turn for trade. Having accumulated a small sum of money he opened a small miscellaneous store. Here he was very successful, and taking advantage of the mania for lotteries which then prevailed throughout the country, he visited New York, and obtained some insight into their management. Returning to his store, he immediately entered into this business upon a large scale, established agencies in various cities and towns, and realized considerable sums from the immense sales of tickets which he was thus enabled to make. The predominating trait in his character would not, however, permit him to settle down as a country store-keeper, and we soon hear of him as the editor of the *Herald of Freedom*, published in Danbury, Conn. In this undertaking he was also very successful in a pecuniary point of view, but his freedom of speech and the boldness of his opinions soon gained him many enemies, and he was several times sued for libel, and once confined in prison for 60 days. In 1834 he removed with his family to New York, having become much reduced in circumstances. Here he tried many ways to obtain a livelihood, but without much success, until 1835, when hearing of Joice Heth, a colored woman, the reputed nurse of George Washington, he visited her owners, and becoming satisfied that here was an opportunity of retrieving his broken fortunes, he became her purchaser for the sum of \$1,000, which he had obtained from various friends. By widely advertising this curiosity, considerable excitement was created, and the receipts soon amounted to \$1,500 per week. This was Mr. Barnum's first attempt as a public showman, and finding the business

BARNUM — BARODA

profitable, he collected a small company and traveled through the country, realizing large sums wherever he halted. In 1836 Joice Heth died, and a post-mortem examination proved her to have been but 75 or 80 years old, instead of 161, which was her reputed age. From 1836 until 1839 Mr. Barnum continued in the exhibiting business, but was then obliged to return to New York, again reduced to poverty. He now barely subsisted by writing occasional articles for Sunday papers, and by petty jobs. In 1841, the establishment known as Scudder's American Museum was announced for sale, and with a boldness almost unparalleled in mercantile transactions, Mr. Barnum negotiated for its purchase; without owning a dollar he made satisfactory arrangements with its holders and took possession. Here his fortune turned; at the end of a year he was able to pay all the obligations which he had entered into on account of the museum. In 1848 he had added to it two other extensive and valuable collections, beside several minor ones, and single curiosities without number. It now became the most popular place of amusement in the United States. In 1842 he heard of Charles S. Stratton, of Bridgeport, then 5 years old, less than 2 feet high, and weighing only 16 pounds. The boy became known to the world as Gen. Tom Thumb, and was exhibited in the United States with astonishing success until 1844, when Mr. Barnum sailed with him for England. Throughout Great Britain he was received with a popularity surpassing even that of America, and for four months the receipts averaged \$500 per day. Tom Thumb was presented to the royal families of England, France, and Belgium, courted and caressed by the nobility, and presented with costly gifts. In Coventry Barnum purchased the "Happy Family" of birds and animals, for which he paid \$2,500. In 1847 he returned to America, where the "General" was again exhibited for a year with increased success, the receipts in the United States and Havana amounting to \$150,000. Barnum conceived the idea of inducing Mlle. Jenny Lind to visit America, and entered into an agreement with her, by which he engaged her to sing in America for 150 nights at \$1,000 per night, the expenses of herself and troupe to be defrayed by him. Jenny Lind arrived in New York 1 Sept. 1850. The excitement upon this occasion has perhaps never been equalled in America. She gave her first concert at Castle Garden, and from that time until June 1851, gave 93 concerts, which were a succession of triumphs, the gross receipts for the whole amounting to over \$700,000. The tickets were generally sold at auction, the highest price paid for one ticket being in Providence, R. I., namely, \$650. He continued before the public with varying success until 1855, when having built himself an extensive villa at Bridgeport, Conn., he retired from business and published his life, giving a full account of the various enterprises in which he had been engaged. He also devoted much of his time to farming, and made many improvements in Bridgeport. Two museums of his were burned, in 1865 and 1868, and in 1871 he established "The Greatest Show on Earth," a combination of traveling circus and menageries. He was defeated for Congress in 1866, but was four times a member of the Connecticut legislature. Besides his 'Autobiography' (1854), he published 'The Humbugs of the

World' (1865), and 'Struggles and Triumphs' (1869).

Barnum, William H., American politician: b. Boston Corners, N. Y., 17 Sept. 1818; d. 30 April 1889. He received a public school education and amassed large wealth in manufacturing; was a member of Congress from Connecticut in 1866-76, when he was elected United States Senator to complete the term of Orris Ferry (deceased). In 1880 and 1884 he was chairman of the Democratic National Committee.

Barnwell, Robert Woodward, American statesman. b. Beaufort, S. C., 10 Aug. 1801; d. 25 Nov. 1882. He was graduated from Harvard University in 1821; became a lawyer; was a member of Congress from South Carolina in 1829-33; a United States senator from that State, 1850-1; commissioner from South Carolina to confer with the Federal government regarding the proposed secession of the State in 1860; member of the Provisional Confederate Congress, 1861-2; a Confederate senator in 1862-6; and then president of the University of South Carolina (an office he had held in 1835-41) till 1873.

Barnwell, Robert Woodward, American bishop of the Episcopal Church: b. Beaufort, S. C., 27 Dec. 1849; d. Selma, Ala., 24 July 1902. He prepared for the Episcopal ministry at the General Theological Seminary in New York, and was rector of Trinity Church, Demopolis, Ala., 1876-80; and of St. Paul's, Selma, Ala., 1890-1900. In 1900 he was consecrated Bishop of Alabama.

Baroccio, ba-röch'ö, or **Barocci, Fiori Federigo**, Italian painter: b. Urbino, 1528; d. there 31 Sept. 1612. In his youth he studied the works of Titian, and, in 1560 he was entrusted by Pius IV. with the decoration of the Belvedere palace. Some of the Roman painters, envious of his genius, invited him to a banquet, where they gave him poison. For four years he was not able to touch his pencil, and afterward could only work two hours a day. His later pictures are in the style of Correggio. His 'Last Supper,' 'Descent from the Cross,' 'St. Francis Stigmatized,' 'Christ and Magdalen,' and 'Annunciation,' are among his best productions.

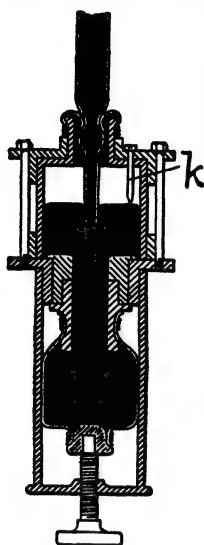
Baroche, ba-rösh, **Pierre Jules**, French statesman: b. Paris, 1802; d. Jersey, 1870. In 1847 he was elected member of the Chamber of Deputies for the department of Charente-Inférieure, where he steadily opposed the ministry of Guizot. He signed the *Acte d'Accusation*, drawn up by Odillon Barrot 23 Feb. 1848, in which they were accused of violating the rights of citizens, and of systematic corruption. On 2 Dec. 1851, Baroche was nominated president of the Council of State; an office in which he exhibited much ability and tact, and subsequently filled the offices of minister of foreign affairs (1860), and minister of justice (1863). He was made a senator in 1864.

Baro'da, a city of Hindustan, in the province of Gujerat, capital of the native state of Baroda, 240 miles north of Bombay, on the left bank of the Viswamitra, here spanned by four stone bridges. The city proper is surrounded by a wall, outside of which are large suburbs. The houses in general are very mean, but there are several palaces, some handsome houses belonging to the wealthy inhabitants, government offices,

BAROMETER

a high school, and numerous temples. It is a place of considerable trade, and the seat of a British resident. Pop. (1901) 103,800. The state of Baroda, which has been tributary to Great Britain from 1802, has an area of 8,100 square miles and a population (1901) of 1,953,000.

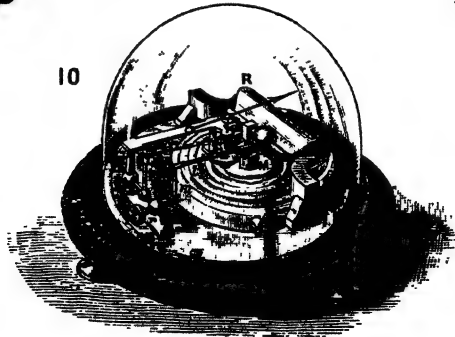
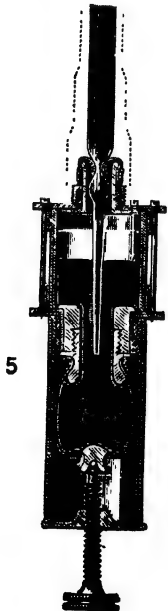
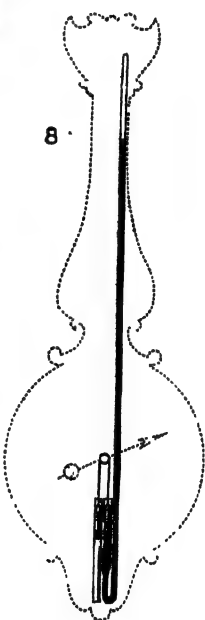
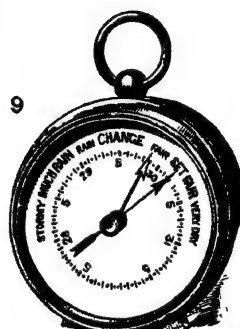
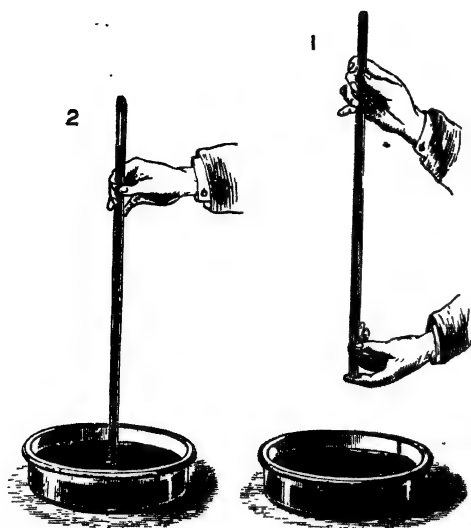
Barometer (Greek, "weight-measure"), an instrument invented by the Italian physicist Torricelli, and used for determining the pressure of the atmosphere. (For an account of its early history see ATMOSPHERE.) In its simplest form the mercurial barometer consists essentially of a vertical glass tube about a yard in length, closed at the top and open at the bottom, and partially filled with mercury, into a vessel of which its lower end also dips. In preparing the instrument for use, the tube is first completely filled with mercury; but as soon as it is free to do so the column of mercury in the tube sinks (leaving a vacuum space at the top of the tube) until it stands at a height (usually about 30 inches) such that the pressure of the column exactly balances that of the atmosphere. A graduated scale of metal or glass is provided, by means of which the difference in level between the



top of the column and the surface of the mercury in the open vessel (called the "cistern") at the bottom can be measured with precision. In the Fortin instrument (the design commonly adopted for all but the most refined work) the cistern is closed below by a piece of flexible leather, which can be raised or lowered by means of a screw, in order to bring the surface of the mercury in the cistern to a certain fixed level, before the reading is taken. A pointed index, *k*, preferably of ivory, projects downward into the cistern from the upper cover, the position of its tip, with respect to the scale on the barometer tube above, being known. The mercury in the cistern being first brought accurately into contact with the extremity of *k*, the position of the upper end of the barometric column is read from the scale. The "apparent" height of the barometer is then known; but in order to deduce the "true" height, certain corrections must be applied. The most important of these is the correction for temperature. The scale from which the height of the column is read is longer when the temperature is high than when the temperature is low; and the mercury in the column is also less dense at higher temperatures than at lower ones. These two sources of error partially compensate each other; for at a high temperature the reduced density of the mercury tends to make the column stand too high, while the greater length of the scale at such a temperature tends to make the reading too small. The compensation is not perfect, however, and when the coefficient of expansion of the scale is known, a table of temperature

corrections must be calculated, to reduce the direct reading to what it would have been if it had been taken at some fixed standard temperature. The temperature of melting ice is adopted, by universal consent, as the standard to which the "apparent" reading is to be reduced. Another important correction must be applied in order to allow for the variations of gravity with the latitude and elevation of the place of observation. Where gravity is relatively weak, a longer column of mercury will be required to balance a given atmospheric pressure than would be required to balance the same pressure in a region where gravity is stronger. All the barometric readings taken at the International Bureau of Weights and Measures, near Paris, are reduced to the values they would have if made at the level of the sea, in latitude 45°; and this practice is growing in favor among physicists generally. To reduce a barometric reading to sea-level and to latitude 45°, it is merely necessary to multiply the observed height of the column (after applying the correction for temperature) by the expression $(1 - 0.0259 \cos L)(1 - 0.0000006 H)$, where *L* is the latitude of the place of observation, and *H* is its height above the sea, in feet. Several secondary corrections have also to be considered, when great refinement is desired. Prominent among these is the correction for "capillarity," which is made necessary by the fact that the mercury does not stand as high in a small barometric tube as it does in a larger one, on account of the surface tension (*q.v.*) of the liquid. No simple formula for this correction can be given, and it varies somewhat according as the barometer is rising or falling at the time of the observation. Tables for finding the capillary correction are given in Guyot's meteorological and physical tables, published under the direction of the Smithsonian Institution at Washington. An excellent table is also given in Guillaume's *Thermométrie de Précision*, where the elaborate precautions taken in filling the modern precision barometer are also described.

The barometer is a simple instrument, and of the greatest use in all kinds of scientific work. The greatest fault of the mercurial instrument is the difficulty of transporting it without breakage and without destroying the vacuum in the upper part of the tube by the admission of air bubbles. Instruments like the Fortin type may be transported by screwing up the leather bottom until both the cistern and the tube are completely filled with mercury, then reversing the barometer, and carrying it to its destination bottom side up. The "aneroid" barometer, although not nearly so accurate as the mercurial instrument, possesses the advantage of portability, since, as its name signifies, it does not contain any liquid; and it is therefore used to a considerable extent in the determination of the heights of places above the sea. (See HYPSONOMETRY.) Various forms of the aneroid exist. One of these consists of a cylindrical metal box, exhausted of air, and having a lid of thin, corrugated metal. The lid, which is highly elastic, yields to every change of atmospheric pressure, and delicate multiplying levers transmit its motions to an index that moves over a graduated scale, whose divisions are marked on the dial empirically, by comparison with a mercurial barometer. For further information concerning the barometer and its



BAROMETRIC LIGHT—BARONY

use, consult Stewart and Gee, 'Elementary Practical Physics'; Glazebrook and Shaw, 'Practical Physics'; Abbe, 'Meteorological Apparatus and Methods'; Guillaume, 'Thermométrie de Précision.' See also METEOROLOGY.

Barometric Light, a name sometimes given to the faint glow (first observed by Jean Picard in 1675) produced in the vacuum space of a mercurial barometer when the instrument is agitated. The light is given off by the mercurial vapor (or other highly attenuated gas) that is present, under the influence of the electricity generated by the friction of the mercury against the glass. Advantage has been taken of this phenomenon in the construction of "self-acting" Geissler tubes, the electricity required to excite them being generated, when they are inverted or shaken, by the friction of a small quantity of mercury introduced before the exhaustion. No very brilliant results can be obtained in this way, however.

Baron, *bä-rôn*, **Michel**, or **Boyron**, French comedian: b. 1653, and long attached to Molière's company. For nearly 30 years he played with great success, and retired from the stage in 1691 without any apparent reason. In 1720, however, he again returned, and was received with immense enthusiasm, playing, with great success, even the most youthful parts. In 1729 he was taken ill while on the boards, and died shortly after.

Baron. In the feudal system of the Middle Ages, at first, the immediate tenant of any superior was called his Baron. In old records the citizens of London are so styled, and the members of the House of Commons, elected by the Cinque-Ports, were called barons. This title was introduced into England by William the Conqueror to signify an immediate vassal of the Crown, who had a seat and vote in the royal court and tribunals, and subsequently in the House of Peers. It was the second rank of nobility, until dukes and marquises were introduced and placed above the earls, and viscounts also set above the barons. It is now the lowest rank of the peerage, and is held by prescription, patent, or tenure. The barons were anciently divided into greater barons, or such as held their lands of the king *in capite*; and lesser barons, such as held their lands of the greater barons by military service. In Germany the ancient barons of the empire were the immediate vassals of the Crown. They appeared in the imperial court and diet, and belonged to the high nobility. But these ancient feudatories were early elevated to the rank of counts or princes. A baron has the title of "right honorable lord," etc., and should be addressed as "my lord" or "your lordship." His wife claims also the title of "right honorable," and may be addressed as "madam," or "your ladyship." The coronation robes of a baron differ from those of the other peers in having but two rows of spots on the mantle; and the parliamentary robes, in having but two guards of white fur, with rows of gold lace. The right of wearing a coronet was first conferred on barons by Charles II. It is adorned with six pearls, set at equal distances, of which four are usually shown. In England, the four puisne judges of the court of exchequer bear the title of baron, and the chief judge that of Lord Chief Baron of the Exchequer. They are

addressed as My Lord, but have no seat in the House of Lords, unless by being previously made a member of the peerage. See also PEER.

Baronet, a hereditary dignity in Great Britain and Ireland next in rank to the peerage, originally instituted by James I., 22 May 1611. The first person to receive the honor was Sir Nicholas Bacon of Redgrave, whose successors in the title have ever since held the rank of premier baronet of the kingdom. Baronets are created by letters-patent, under the great seal, and the honor is generally given to the grantee and the heirs male of his body lawfully begotten, though sometimes it is entailed on collaterals. The order was created nominally to assist in the plantation of Ulster, but really in order to raise money for the king, and each baronet, on his creation, was obliged to pay into the treasury a sum amounting to a little less than \$5,500. According to the terms of its foundation the dignity could be conferred only on those who had the right by inheritance from at least a grandfather to wear coat-armor, and whose income from lands was not less than \$5,000 per annum. In 1622 there were 200 baronets in England, this being the number to which the order was originally limited. Charles I. and subsequent sovereigns disregarded altogether the original limitation of the number. Precedence is given to baronets before all knights, except those of the Garter, bannerets created on the field, and privy-councillors. An order of Baronets of Ireland was also instituted by James I., for the same purpose and with the same privileges as the baronets of England. Since the union, in 1801, none have been created otherwise than as baronets of the United Kingdom. Charles I. instituted an order of Baronets of Scotland and Nova Scotia in 1625, for the purpose of advancing the plantation of Nova Scotia, in which the king granted a certain portion of land to each member of the order. Since the union the power of the Crown to create new baronets specially connected with Scotland is held to have ceased.

Baronius, **Cæsar**, Italian ecclesiastical historian: b. Sora, 1538; d. 30 June 1607. He was educated at Naples; in 1557 went to Rome; was one of the first pupils of St. Philip of Neri, and member of the oratory founded by him; afterward cardinal and librarian of the Vatican Library. He owed these dignities to the services which he rendered the Church by his edition of the Roman Martyrology, 'Ecclesiastical Annals,' in reply to the Protestant 'Magdeburg Centuries,' comprising valuable documents from the papal archives, on which he labored from the year 1580 until his death. They were continued, though with less power, by other writers, of whom Raynaldus takes the first rank.

Barons' War, the war carried on for several years by Simon de Montfort and other barons of Henry III. against the king, beginning in 1263. See also MONTFORT, SIMON DE.

Barony, the lordship or fee of a baron, either temporal or spiritual. Originally every peer of superior rank had also a barony annexed to his other titles. But now the rule is not universal. Baronies in their first creation emanated from the king. Baronies appertain also to bishops, as formerly to abbots. William the Conqueror having changed the

BAROTSE — BARRACKPUR

spiritual tenure of frank-almoyn, or free alms, by which they held their lands under the Saxon government, to the Norman or feudal tenure by barony. It was in virtue of this that they obtained seats in the House of Lords. The word is commonly applied in Ireland to a subdivision of a county.

Barotse, bā-rōt'se, a South African people inhabiting a region in the west of Rhodesia, extending from the Chobe River northward to the Kabompo. They are a branch of the Bechuanas who have migrated northward, and it would appear that they were long subject to a Basuto tribe called the Makololo. About 1860, however, they threw off the yoke of their oppressors and almost exterminated them, but they still speak the language of the Makololos. Their country is a treeless, alluvial plain, over 150,000 square miles in extent. From 1890 King Lawanika acknowledged the virtual supremacy of Great Britain, and in 1898 the British South African Company obtained complete administrative powers.

Barou'che, a four-wheeled carriage with a falling top. There are usually two inside seats in which four persons can sit.

Barquesimeto, bār-kę-sę-mā-tō, a city of Venezuela, capital of the state of Lara; is situated in a high plain, on the Barquesimeto River. It was founded by the Spaniards in 1552. The soil of the neighborhood is very fertile. Coffee of excellent quality is grown here. The town is well built, and has wide streets, and among its prominent buildings are the government palace, barracks, market and Cathedral. Pop. (1899) about 40,000. Previous to the earthquake of 1812 it contained 15,000 persons, but that calamity destroyed 1,500 lives, and left scarcely a house standing.

Barr, Amelia Edith, (HUDDLESTON), Anglo-American novelist: b. Ulverstone, Lancashire, England, 29 March 1831. She was the daughter of the Rev. William Huddleston, and in 1850 married Robert Barr. She came to the United States in 1854, and lived for some years in Texas; but after her husband's death (1867) removed to New York, where her first book, 'Romance and Reality,' was published in 1872. She is a prolific writer, and her more than 30 novels are very popular. Among them are 'Jan Vedder's Wife' (1885); 'A Daughter of Fife' (1885); 'A Bow of Orange Ribbon' (1886); 'A Border Shepherdess' (1887); 'Friend Olivia' (1890); 'A Sister to Esau' (1891); 'Remember the Alamo'; 'Prisoners of Conscience' (1897); 'I, Thou, and the Other One' (1899); 'Trinity Bells' (1899); 'The Maid of Maiden Lane' (1900); 'The Lion's Whelp' (1901); 'Souls of Passage' (1901).

Barr, James, Canadian author: b. Wallace-town, Ontario, 1862. He engaged in journalism in that province, the United States, and in London; and under the pen-name of ANGUS EVAN ABBOTT has contributed much to magazine literature. Among his separate publications are 'American Humorous Verse' (1891), and the American volume in the 'International Humorous Series' (1893), the last containing a biographical index of nearly 200 American and Canadian humorists. He is a brother of Robert Barr (q.v.).

Barr, Robert, Scottish novelist: b. Glasgow, 16 Sept. 1850. He spent his childhood in Canada, drifted into journalism, and in 1876 joined the staff of Detroit *Free Press*, and wrote under the name of LUKE SHARP. He went to London in 1881 and in 1892 founded *The Idler* with Jerome K. Jerome, but retired in 1895 to devote himself to fiction. He is author of 'In a Steamer Chair' (1892); 'In the Midst of Alarms' (1894); 'The Face and the Mask' (1895); 'One Day's Courtship' (1896); 'A Woman Intervenes' (1896); 'Countess Tekla' (1899); 'The Unchanging East' (1900); 'The Victors' (1901); 'A Prince of Good Fellows' (1902).

Barra, a small Mandingo kingdom of western Africa, near the mouth of the Gambia, with an estimated population of 200,000, its men being remarkable for their fine proportions. The surface, which is fertile, but rather marshy, is well cultivated. The territory about the mouth of the river belongs to the British, who have built the port of Albreda on the south bank, from which considerable trade is carried on. The chief town is Barrinding, where the so-called king resides.

Bar'ra, a Scottish island, forming part of the Outer Hebrides, eight miles long and from two to five wide, and almost entirely composed of gneiss, which on the west coast forms huge rocky barriers. On these the Atlantic, beating with all its force, has hollowed out vast caves and fissures. In the interior not merely the hollows and valleys, but many of the loftiest hills are clothed with fine pasture, on which large herds of cattle and flocks of sheep are reared. The coasts abound with fish, and the island forms a fishing centre of some importance. There are many standing stones and other antiquities. Pop. (1891) 2,131.

Bar'racan, strictly, a thick, strong fabric made in Persia and Armenia, of camel's hair, but the name has been applied to various wool, flax, and cotton stuffs.

Barracand, bā-ra-cōn, **Leon Henri**, French poet and novelist: b. Romans, Drôme, 2 May 1844. He gave up the law when a very young man in order to write verses; but he was not much known as a poet until 'Dananiel' (1886) appeared, under the pseudonym of LEON GRANDIER, followed by a sequel, 'Doctor Gal' (1870). He had already, however, attracted attention by some fictions, and has steadily risen in importance as a novelist—'Yolande' (1867); 'Hilaire Gervais' (1885); 'The Second Lieutenant's Manuscript' (1887); and 'The Cousin' (1888), being perhaps best known. His 'Lamartine and the Muse' (1883) was crowned by the French Academy.

Barrack Room Ballads, a book of verse by Rudyard Kipling, published in 1892. It deals with the various experiences of Tommy Atkins, the British private, and no such vivid portraiture of the common soldier with his dullness, his unhesitating obedience, and his matter-of-fact heroisms has appeared elsewhere.

Barrackpur, bā-rāk-poor', a town and cantonment in Hindustan, on the Hooghly, 15 miles north of Calcutta. In the vicinity is the suburban residence of the Viceroy of India, within a park four miles in circuit. A sepoy mutiny, the prelude to the great outbreak at

BARRACKS—BARRAS

Meerut in May, took place here in February 1857. A mutiny had previously taken place in 1824. Barrackpur is also known as North Barrackpur to distinguish it from South Barrackpur or Agarpura, midway between it and Calcutta. Pop. 18,000.

Barracks, a name originally given to temporary accommodation for troops, but now designating permanent and commodious erections, in which troops are lodged in fortified towns or other places. The introduction of barracks into England was opposed as dangerous to liberty, by estranging the soldier from the citizen, and fitting him to become a tool of despotism; but the billeting of soldiers upon citizens had grown to be so burdensome to communities that after the close of the 18th century extensive barracks were built at convenient stations all over the United Kingdom. Much improvement has been effected in the construction and arrangement of English barracks during the last half-century; and separate quarters are now provided for married soldiers. The construction and repair of barracks is part of the duty of the royal engineers; their equipment and allotment is intrusted to a barracks section of the Army Service Corps. In the United States the term is officially used to designate important military posts, such as the Columbus Barracks, San Diego Barracks, Washington Barracks, and others.

Barracoon, a negro barrack or slave depot, formerly plentiful on the coasts of Africa, Cuba, and Brazil.

Barracuda, *bār-ra-koo'da*, an oceanic fish of the family *Sphyrnidae*, of which about 20 species inhabit the warm seas of the whole world. All are elongate, pike-like fishes, with long, pointed jaws filled with sharp teeth. They are often of large size, are powerful swimmers, active and voracious, and, like the bluefish, prey upon schools of smaller fishes. Several species occur on the American coasts. The great barracuda "picuda," or "becuna" (*Sphyrna picuda*), is common throughout the West Indies and northward to South Carolina, and reaches a length of six feet. It is the largest and most voracious of the genus, is as fierce as a shark, and is sometimes dangerous to bathers. Other West Indian species are those called guaguanché, and picudilla. These are smaller, as is a third species also, which is common along the Atlantic coast of the United States. Two or three species are found on the Pacific coast from California southward. One of these (*S. argentea*) is a long and slender species, known as the California "barracouta," and highly valued for food. It closely resembles the typical European barracuda (*S. sphyrna*), locally known as "spet" and "sennet," and one of the important food-fishes of the Mediterranean.

Barramunda, *bār-ra-mūn'da*, or **Burnett Salmon**, names in Australia for a mud-fish (*Ceratodus*), remarkable as a survival of the very ancient group Dipnoi. See LUNG-FISH.

Barrande, *ba-rānd*, **Joachim**, French geologist: b Sables in the department of Haute Loire, 11 Aug. 1799; d. Vienna, 5 Oct. 1883. His specialty was the Silurian formations in Bohemia, his writings including 'Système Silurien du Centre de la Bohême' (1852 and 1887); 'Colonie dans le Bassin Silurien de la Bohême' (1860); 'Documents sur la Faune

Primordiale et la Système Taconique en Amérique' (1861); 'Représentation de Colonies de la Bohême dans le Bassin Silurien du nordouest de la France' (1853); 'Céphalopodes, Etudes Générales'.

Barran'dite, a mineral occurring in rounded concretions exhibiting a concentric structure as well as indistinct radial fibres. It is gray, usually with tinges of color, and has a hardness of 4.5 and a specific gravity of 2.58. Its composition is $(Al,Fe)PO_4 + 2H_2O$, the iron and aluminum being present in the ratio of about 4 to 3. It is found mainly at Cernovic in Bohemia.

Barranquilla, *bar-ran-kē'lya*, the chief commercial centre of Colombia, some 15 miles from the mouth of the Magdalena. The bar at the mouth of the river has been improved so as to enable sea-going vessels to pass up to Barranquilla, which possesses excellent wharfage accommodation. The inland traffic by river steamers is important. The trade is mainly in the hands of Germans. It is the seat of a United States consulate. Pop. about 40,000.

Barrantes y Moreno, *bar-ran'tā-se-mō-rā'nō*, **Vicente**, Spanish writer: b Badajoz, 24 March 1829. He first studied theology, but in 1848 settled in Madrid to pursue literature; held responsible government offices; became a member of the Academy in 1872. Among his works are the stories 'Always Late' (1851); 'Juan de Padilla,' 'The Widow of Padilla,' and a series of historical studies, dealing with strictly local Philippine and Estremaduran topics. His 'Tales and Legends' are well chosen and well written; but a work on 'The Defects and Dangers of Universal Suffrage,' partly fiction and partly satire, is ineffective.

Barras, *ba-rās*, **Paul François Jean Nicolas, Comte de**, French statesman: b Fox-Amphoux (Var), 30 June 1755; d. January 1829. When the Revolution broke out he immediately showed himself an opponent of the court, and had a seat in the *tiers-état*, while his brother was sitting among the nobility. He took part in the attacks upon the Bastille and the Tuileries, was elected a jurymen at the tribunal of Orleans, and in September a member of the national convention, where he voted for the death of Louis XVI. Although he had established his reputation as a patriot, yet he displeased Robespierre, who resolved to involve him in the great proscription which he then meditated. Barras therefore joined those determined to overthrow Robespierre, and took an important part in the events of the 9th Thermidor (27 July 1794). He was entrusted with the chief command of the forces of his party, repelled the troops of Henriot, and made himself master of Robespierre. On 4 Feb. 1795 he was elected president of the convention. The 13th Vendémiaire (5 Oct. 1795), when the troops of the sections which favored the royal cause approached the convention, Barras for a second time received the chief command of the troops of the convention, and the battalion of the patriots, who hastened to their assistance. On this occasion he employed Gen Bonaparte. In his report he attributed the victory to this young general, and procured for him the chief command of the army of the interior. His important services promoted him to the Directory.

BARRASS — BARREL

Barras soon perceived that Bonaparte would give a decisive superiority to him who should obtain an influence over him; and therefore he displaced Carnot from the War Department and took possession of it himself. This separated them, and Carnot for some time took part with the council, where a party had been formed to restrain the power of the Directory, and particularly that of Barras. The rupture could only terminate with the ruin of one of the parties: that of the council fell by the events of the 18th Fructidor (4 Sept. 1797), in which Barras took a leading part. From this period he governed absolutely until 13 June 1799, when Siéyès entered the Directory. Nevertheless Barras succeeded in preserving his seat, but he became a victim of the 18th Brumaire (9 Nov. 1799). In a letter which he sent to St. Cloud he resigned his office, and received a passport to his estate. He afterward retired to Brussels, where he lived for several years; but finally received permission to repair to the south of France. His memoirs were published in French and English (1895-6).

Barrass, Edward, Canadian clergyman: b. Durham, England, 22 July 1821. He entered the ministry in 1840, and removed to Toronto in 1853. He became the assistant editor of the *Christian Guardian*, and published, among other works, 'A Gallery of Deceased Ministers' (1853); 'Class Meetings: Their Origin and Advantages' (1865); 'A Gallery of Distinguished Men' (1870); and 'Smiles and Tears: or, Sketches from Real Life' (1879).

Bar'ratry, a law term applied to (1) the offense committed by the master of a vessel of embezzling or injuring goods committed to his charge for a voyage. Barratry has also been defined to be an unlawful or fraudulent act, or very gross or culpable negligence, of the master or mariners of a vessel in violation of their duty as such, and directly prejudicial to the owner, and without his consent; (2) the offense of frequently exciting and stirring up law suits or quarrels among one's neighbors or in society generally. An indictment for this offense must charge the offender with being a common bar-rator, and the proof must show at least three instances of offending. An attorney is not liable to indictment for maintaining another in a groundless action. In New York, and some other States, barratry is defined to be the practice of exciting groundless judicial proceedings, and is a misdemeanor.

Barre, bär, Antoine le Fèvre de la, French naval officer: b. about 1600; d. 4 May 1688. He was appointed governor of Guiana in 1663, and re-took Cayenne from the Dutch. In 1667 he defeated the English in the Antilles, forcing them to raise the blockade of St Christopher. In 1682 he was appointed to the governorship of Canada, taking the place of the Count de Frontenac. He was, however, recalled in 1684, for having by his irresolution caused the failure of the expedition to treat with the savages.

Barré, Isaac, British officer: b. Dublin, 1726; d. London, 20 July 1802. He was wounded at Quebec, was beside Wolfe when he fell, and figures in West's picture of 'The Death of Wolfe.' He entered parliament in 1761, and held office successively under Lord Butte, Pitt, Rockingham, and Lord Shelburne. In Pitt's

second administration he exposed the corruptions of the ministry, was a strong opponent of Lord North's ministry, and opposed the taxation of America. The town of Barre, Mass., was named in his honor.

Barre, bar'rá, a group of Arawakan tribes dwelling along the Upper Rio Negro in north-western Brazil and the adjoining districts of Venezuela. They are extremely aggressive, and their language is extending rapidly throughout that region.

Barre, bär're, Mass, a town in Worcester County, on the Ware River, 21 miles north-west of Worcester. An institute for feeble-minded children is established here, and there are cotton, woolen, and straw factories. It was named for Col. Isaac Barre (q.v.). Pop. (1900) 2,059.

Barre, Vt., a city in Washington County, on the Central V., the Barre, and the Montpelier & W. R. R.R.'s; six miles southeast of Montpelier. Barre received a city charter in 1894; and has a reputation as one of the most important seats of the granite industry in the United States. It contains, besides granite quarries, several industrial plants connected therewith; a national and two savings banks; a public library; opera house, Goddard Seminary; a home school for young men and women, with four courses of study; Spaulding High School; daily and weekly newspapers; an assessed property valuation exceeding \$2,500,000, and a total debt of about \$150,000. It was incorporated in 1894. Pop. (1900) 8,448.

Barreiro, ba-rä'e-rö, **Juan Baptista Hernandez**, Cuban lawyer: b. Havana, about 1842. He acquired a liberal education, and amassed large wealth in the practice of his profession. He was professor of Roman law in the University of Havana for 30 years; and more recently was dean of the law faculty in the university. In February 1900, while acting as first assistant mayor of Havana, he was appointed a member of the new Cuban Civil Cabinet, and given the portfolio of public education.

Barrel, a hollow vessel made of staves, set on end, arranged around a circle, and bound together with hoops. By each stave being made wider in the middle and tapering a little toward the ends, the barrel is of larger diameter, or bulges, in the middle. The bevelled edges of the staves cause them to fit closely together, making a tight joint along their length. The ends are closed by circular heads, the edges made thin to fit into a groove cut to receive them near the ends of the staves, in which they are held fast by driving the hoops upon the swell of the barrel. The construction of the barrel is ingeniously adapted for combining great strength with lightness. It resists pressure from without by the arched arrangement of the staves; and the hoops secure it from the expansive force of gases often generated in its contents. Its form is the most convenient for transportation, admitting of the vessel being rolled or rapidly swung by hooks placed under the chine or ends of the staves. In the form of kegs, firkins, liquor casks, butts, hogsheads, etc., they are met with everywhere. Yet the Chinese, with all their ingenuity, it is said, have never made a barrel. Formerly barrels were constructed entirely by hand, the cooper shaving the staves with the draw knife, and shaping them

BARREN GROUNDS — BARRETT

by clamps. But machines are now applied to this purpose, by which the work is done much more expeditiously. See COOPERAGE.

As a measure of capacity, the barrel is of variable dimensions, differing in size with the materials it is designed to hold. In wine measure the barrel must contain 31½ gallons. A barrel of beer in England is equal to 36½ imperial gallons. In the United States a barrel of flour must contain 196 pounds; and a barrel of beef or pork, 200 pounds. The measure of capacity called barrel bulk is five cubic feet. Barrel is also used to express any thing long and hollow, as a gun-barrel. It is also applied to the cylinder in a watch, about which the spring is coiled; and in anatomy, to the "cavity of the tympanum" of the ear.

Barren Grounds, the name given to a large tract in the Northwest Territories of Canada, extending northward to the Arctic Ocean between Great Bear and Great Slave lakes and Hudson Bay. It consists largely of swamps, lakes, and bare rock, and a comparatively small part of it is yet well known. The vegetation chiefly consists of dwarf birches and willows, mosses and lichens. The animals include the reindeer, musk-ox, beaver, polar bear, wolves, foxes, etc.

Barren Island, a volcanic island in the Andaman Sea, about lat. 12° 15' N.; lon. 93° 54' E. Its diameter is about two miles, with submarine slopes plunging rapidly to a depth of more than 800 fathoms. There is an ancient crater over a mile in diameter, from the centre of which a newer cone rises to a height of 1,015 feet. The volcano was active in 1789 and 1803, but is now dormant. A small island near Coney Island, New York, is also known as Barren Island.

Barren Measures, the name given to certain groups of strata associated with the coal measures, but which contain no workable deposits. In the United States there are two so-called barren stages, a lower intervening between the lower productive and the upper productive measures, and an upper lying at the base of the Permian System.

Barrès, ba-rès, Maurice, French novelist: b. Charms-sur-Moselle, 1862. His earlier writing as exemplified in his 'Sous l'œil des Barbares' (1888); 'Un Homme Libre' (1889); and 'Le Jardin de Bérénice' (1891), is more or less decadent in character, but his later work is much more forceful, and inculcates a healthful spirit of nationalism. 'Les Déracines' (1897) is among the best of his latest writings.

Barrett, Benjamin Fisk, American Swedenborgian clergyman: b. Dresden, Me., 1808; d. Germantown, Pa., 6 Aug. 1892. He was graduated from Bowdoin College in 1832, and held Swedenborgian pastorates in New York, Cincinnati, and Philadelphia. He was a voluminous writer and industrious editor of books and periodicals relating to Swedenborgianism. Chief among them are: 'Life of Swedenborg' (1841); 'Letters on the Divine Trinity' (1860; 4th ed. 1873); 'Catholicity of the New Church' (1863); 'Episcopalianism' (1871); 'New View of Hell' (1870; 5th ed. 1886); 'Swedenborg and Channing' (1878); 'Heaven Revealed' (1885).

Barrett, George Hooker, American actor: b. Exeter, England, 9 June 1794; d. 5 Sept. 1860. He left England with his mother, an actress of some celebrity, and arrived at Boston in October 1796; he made his first appearance the same year in the part of Cora's child, in 'Pizarro,' at the age of two years. He commenced playing in New York in 1806, at the Park Theatre, in the part of 'Young Norval,' and became manager of the Bowery Theatre, New York, in 1826, in company with E. Gilbert. He afterward visited England, and in 1837 performed at Drury Lane Theatre, London, under the management of Alfred Bunn. He was also manager of the Tremont Theatre, Boston, and in 1847 opened the Broadway Theatre, New York, but he did not retire from the stage. His favorite characters were in genteel comedy, but he also acted in farce and low comedy with great success. From his elegance and stateliness he was known by the sobriquet of "Gentleman George."

Barrett, John, American diplomatist: b. Grafton, Vt., 28 Nov. 1866. He was graduated at Dartmouth College in 1889, and the same year went to the Pacific coast and engaged in journalism till 1894. During 1894-8 he was United States minister-resident and consul-general at Bangkok, Siam, and, afterward represented several American newspapers in Manila, Philippine Islands. After the American victory in Manila Bay he made a special study of conditions in the Philippines, and, returning by way of London, addressed a joint assembly of members of the House of Commons and the London Chamber of Commerce, on the condition of trade in the Far East. He returned to the United States in the summer of 1899, and did much in support of the action of the Federal government in the Philippines.

Barrett, John Kelly, Canadian official: b. Hamilton, Ontario, 5 June 1860. He was graduated at Holy Cross College, Worcester, Mass., in 1872, and after serving as principal of St. Mary's Model School in Hamilton entered the public service, principally in the line of education. He became conspicuous in 1890, when the authorities of Manitoba abolished the Roman Catholic schools and the official use of French in that province, by defending the claims of the Roman Catholic minority and by bringing suit against the city of Winnipeg to test the constitutional power of the Provincial Government in passing the School Act of 1890.

Barrett, Lawrence, American actor: b. Paterson, N. J., 4 April 1838; d. 21 March 1891. His first appearance on the stage was in 1853, in 'The French Spy.' In 1856 he appeared as Sir Thomas Clifford in 'The Hunchback' at Chambers Street Theatre, New York, and in 1857 he supported Burton, Charlotte Cushman, Edwin Booth, and other eminent actors. He served as a captain in the 28th Massachusetts Infantry in the early part of the Civil War. Later he acted at Philadelphia, Washington, and at Winter Garden, in New York, where he was engaged by Mr. Booth to play Othello to his Iago. After this he became an associate manager of the Varieties Theatre in New Orleans, where for the first time he played the parts of Richelieu, Hamlet, and Shylock. In 1864 he secured 'Rosedale' from Lester Wallack, and after appearing in its leading character at New

BARRETT — BARRIE

Orleans, began his first tour as a star actor. In 1867 he played at Maguire's Opera House in San Francisco, and was then manager of the California Theatre till 1870. Late in 1870 he went with Mr. Booth, playing in alternate characters in Booth's Theatre. In 1871-2 he was manager of the New Varieties Theatre in New Orleans, and in December 1872 acted Cassius to Booth's Brutus in New York. During 1873-4 he made tours through the United States. In 1875 he appeared as Cassius in 'Julius Cæsar,' in Booth's Theatre, and later as King Lear. He was the first actor to appear as Daniel Druce in the United States in Mr. Gilbert's play. In 1882 he brought out 'Francesca di Rimini,' at the Chestnut Street Theatre in Philadelphia. In 1883 this play ran for nine weeks at the Star Theatre, in New York. In 1887 he began his first joint engagement with Edwin Booth in Buffalo. Mr. Barrett's last production of a new play was 'Guido Ferranti' by Oscar Wilde, brought out in 1890, at the Broadway Theatre, New York. His last appearance was on 18 March 1891, in the character of Adrian du Mauprat to the Richelieu of Mr. Booth. He wrote 'Life of Edwin Forrest.'

Barrett, William Alexander, English journalist and musician: b. London, 15 Oct 1834; d. 17 Oct. 1891. He was musical critic of the London *Morning Post* from 1867 till his death, and edited several musical journals. He published a 'Life of Balfe'; 'The Choristers' Guide'; 'English Church Composers'; 'English Folk Songs, Glees, and Madrigals,' and a 'Dictionary of Musical Terms' (with Stainer.)

Barrett, William Fletcher, English scientist: b. Jamaica, West Indies, 10 Feb. 1844. He assisted Prof. Tyndall at the Royal Institution, London, 1862-6, and in 1873 became professor of experimental physics in the Royal College of Science, Dublin. He was one of the founders of the Society for Psychical Research, and is widely known for his original researches in magnetism and radiant heat. He has published 'Lessons in Science' (1880); 'Early Chapters in Science' (1899); 'A Monograph on the So-called Divining Rod' (1897-1900).

Barrett, Wilson, English dramatist and actor: b. Essex, 18 Feb. 1846. He was the son of a farmer, and went upon the stage in 1863. In 1874 he became manager of the Amphitheatre in Leeds, and later lessee of the Grand Theatre in Leeds; in 1879 manager of the Court Theatre, London; and in 1881, of Princess' Theatre, London. He visited the United States in 1886, and, returning to England in 1887, became manager of the Globe Theatre; revisited the United States in 1888, and again in 1889; in 1896 became manager of the Lyric Theatre, London; and in 1899, of the Lyceum. His dramas include 'The Sign of the Cross'; 'Pharaoh'; 'Now-a-days'; 'The Daughters of Babylon'; 'In Old New York'; etc.; and he has adapted for stage purposes such well-known novels as 'The Deemster'; 'The Bondman'; 'The Manxman'; and 'Quo Vadis.'

Barrhead, a manufacturing town of Scotland, seven miles southwest of Glasgow. The chief industries are the printing of cottons, the spinning of cotton yarn, dyeing, bleaching, iron and brass founding, and the making of machinery and sanitary appliances. Pop. (1901) 9,900

Barrias, ba-rê-as, Felix Joseph, French painter: b. Paris, 13 Sept. 1822; a pupil of Leon Cogniet. His most successful works are 'Cinnatus' (1844); 'Sappho' (1847); and 'Death of Chopin' (1885). He was awarded the Grand Prix de Rome, 1844; Legion of Honor, 1859; first medal at the Paris Exposition, 1889.

Barrias, Louis Ernest, French sculptor: b. Paris, 1841. His first success was the 'Spartans' for the garden of the Tuileries in 1871. Among his latest works are the Carnot Memorial for the city of Bordeaux (1896), and the bronze statue of Laboisier for Paris (1900).

Barricade, an obstruction hastily improvised to defend a narrow passage (for instance, a street, a bridge, etc.), serving to retard an enemy and afford an opportunity of firing upon them with effect. Carriages, casks, chests, furniture, beams—in short, everything which is at hand is used for this purpose; and if it is necessary that the enemy, when consisting principally of cavalry, should be checked in the pursuit, though it be but for a moment, the baggage wagons may be employed with effect. Barricades, constructed of the first materials that came to hand, were used in popular insurrections during the Middle Ages, and Paris has obtained notoriety as the city in which they have been most frequently employed. In 1358 its streets were barricaded against the Dauphin. The first "Battle of the Barricades" took place on the entry of the Duke of Guise into Paris, 12 May 1588. It was followed, during the War of the Fronde, by another contest of a somewhat similar character, 26 Aug. 1648, when Anne of Austria ordered the arrest of three popular members of the parliament. In July 1830, the elder branch of the Bourbons, and in February 1848, the Orleans branch of the same family, were driven from the French throne, after a struggle at the barricades. Gen. Cavaignac, in defense of the provisional government, waged a fearful contest with the insurgents, who had erected barricades, 23-26 June 1848, in which he was at length victorious. The killed and wounded amounted to 15,000, and about 8,000 of the rebels were taken prisoners.

Napoleon III. widened and macadamized many of the principal streets of Paris, partly with the express purpose of rendering the successful erection of barricades next to impossible; but nevertheless in the second siege of Paris (1871), the Communists threw up numbers of strong barricades. There was a remarkable barricade erection in London in 1821. The ministry desired that the body of Queen Caroline should be conveyed out of the country to Germany, for interment without the populace having the opportunity of making any demonstration. On the matter becoming known, a vast barricade was erected at the point where the Hampstead Road joins the New Road; and as nothing but the use of artillery could have forced the way, the officer in charge of the funeral changed his course. In 1848 and 1849 barricades were successfully carried in Paris, Berlin, Vienna, and Dresden, by taking the defenders in the rear.

Barricades, The Days of the, a phrase employed to denote popular Parisian revolts. See also BARRICADE.

Barrie, James Matthew, popular Scottish author: b. Kurriemuir, Forfarshire, 9 May 1860. He graduated from Edinburgh Univer-

BARRIE — BARRINGTON

sity in 1882, and went to London in 1885, to engage in journalism. His peculiar talent for depicting Scottish village life and rustic characters with fidelity, pathos, humor, and poetic charm, has brought him fame. 'Better Dead' (1887) and 'When a Man's Single' (1888) were followed by 'Auld Licht Idylls' (1888) and a 'Window in Thrums' (1889), which first made him widely known. 'An Edinburgh Eleven' (1890). 'My Lady Nicotine,' humorous essays on smoking (1890); 'The Little Minister' (1891); 'Sentimental Tommy' (1896); 'Margaret Ogilvy' (1896), a biography of his mother; 'Tommy and Grizel' (1900); 'The Little White Bird' (1902), etc. He has also written numerous short sketches, and the following dramatic works: 'Walker, London' (1892); 'Jane Annie' (1893); and 'The Professor's Love Story' (1895). 'The Little Minister' was dramatized in 1897, and was played with success in the United States. See Hammerton, 'James Matthew Barrie and His Books' (1900).

Barrie, Canada, a town and county-seat of Simcoe County, North Ontario, on Kempenfeldt Bay and the Grand T. R.R.; 64 miles north-northwest of Toronto. It is popular as a summer resort; is a shipping point for grain; is lighted by gas and electricity; has foundries, machine shops, stove, pump, and woolen factories, tanneries, flour mills, weekly newspapers, and several churches and schools, and a collegiate institute. The town was founded in 1832 and incorporated in 1871. A United States consular station is here. Pop. (1901) 6,549.

Barrier Reef, The Great, a coral reef or line of reefs extending for 1,260 miles off the northeast coast of Australia, at a mean distance from land of 30 miles. It rises precipitously from a great depth, no bottom having been found at some places with a line of 285 fathoms. This reef renders navigation dangerous, though the danger is now less since the reef has been surveyed. Inside the reef there is a good channel of about 12 fathoms deep throughout, and protected from the sea by the reef itself. The reefs cover an area estimated at 100,000 square miles.

Barrier Treaty. When, by the Peace of Utrecht, the Spanish Netherlands were ceded to Austria, 1715, this cession was agreed to by the Dutch, who had conquered these provinces in alliance with England, only on condition that they should have the right (in order to secure their borders and give them a barrier against their powerful neighbor, France) to garrison several fortresses of the country, and that Austria should engage to pay yearly to Holland 350,000 dollars for the support of these garrisons. The treaty which was concluded between Austria, England, and Holland was called the Barrier Treaty. In 1781 the Emperor Joseph II. declared it void.

Barrière, ba-ryâr, Jean François, French historical writer: b. Paris, 12 May 1786; d. there, 22 Aug. 1868. His energies were first directed to periodical literature; but he subsequently produced 'The Court and the City Under Louis XIV., Louis XV., and Louis XVI.,' besides editing a numerous series of memoirs of personages connected with the Grand Monarch.

Barrière, Théodore, French dramatist: b. Paris, 1823; d. there, 16 Oct. 1877. In collaboration with others he supplied the French

stage with a great number of dramas and comedies, some of which met with much favor, especially 'Bohemian Life' (1848, with Murger); 'The Maids of Marble' (1853, with Thiboust), a counterpart to Dumas' 'The Camelia Lady,' and 'The Spurious Men of Honor' (1856, with Capendu), a scathing satire, and his masterpiece.

Barriers, Battle of The, an engagement between the French and the Allies in front of Paris, March 1814, in which the former were defeated. Its immediate result was the abdication of Napoleon.

Barrili, bar-rê'le, Antonio Giulio, Italian novelist: b. Savona, 14 Dec. 1836. Engaging in journalism when only 18, he assumed the management of *Il Movimento* in 1860, and became proprietor and editor of *Il Caffaro* in Genoa in 1872. He had taken part in the campaigns of 1859 and 1866 (with Garibaldi in Tyrol) and in the Roman expedition of 1867, and sat in the Chamber of Deputies in 1876-9. He is one of the most prolific writers of modern Italy, and among his numerous stories are 'Elm Tree and Ivy' (1868); 'The Vale of Olives' (1871); 'As in a Dream,' 'The Devil's Portrait' (1882); 'The Eleventh Commandment,' 'A Whimsical Wooing.' He has published several volumes of criticism, among which may be named: 'Irrinnovamento Letterario Italiano' (1890).

Barring-out, a practice once common in some English schools and rendered familiar to many from forming the subject of one of the tales in Miss Edgeworth's 'Parent's Assistant.' It generally took place a few days before the holidays, when the boys barred the doors of the school and defied the masters from the windows. It was commonly understood that the pupils might dictate terms as to holidays for the ensuing year if they could prevent the masters' entrance for three successive days. The origin of the practice is not known; but its observance is enjoined in the statutes of Witton School, Cheshire, founded in 1588, by Sir John Deane.

Bar'ringer, Daniel Moreau, American statesman: b. in the county of Cabarrus, N. C., 1807; d. White Sulphur Springs, Va., 1 Sept. 1873. He graduated at the University of North Carolina in 1826, established himself in the practice of law in 1829, and, after gaining distinction as a lawyer, was, in 1843, elected a representative to the National Congress. He was twice re-elected, and was minister to Spain, 1849-53. He was a delegate to the National Union Convention in Philadelphia in 1866.

Barringer, Rufus, American lawyer and soldier: b. Cabarrus County, N. C., 2 Dec. 1821; d. Charlotte, N. C., 3 Feb. 1895. He graduated from the University of North Carolina, 1842, and settled in the practice of law at Concord. Though a strong Union man he followed his State into the Confederacy, raised a company of cavalry, and by June 1864, had risen to the rank of brigadier-general. He was in 76 actions, and was severely wounded on several occasions. At the close of the war he returned to the practice of law, advocated the acceptance of the reconstruction acts, and took a prominent part in State politics until his retirement in 1884.

Bar'rington, Daines, English lawyer, antiquary, and naturalist: b. 1727; d. March 1800. After preparatory studies at Oxford and the

BARRINGTON — BARRIOS

Inner Temple, he was called to the bar, and held several offices previous to his being appointed a Welsh judge in 1757. He was subsequently second justice of Chester till 1785, when he resigned that post, and thenceforward lived in retirement, chiefly at his chambers in the Inner Temple, where he died. His publications were numerous, but his name is now best known as a correspondent of *White of Selborne*, whose famous letters on natural history he is said to have suggested. He was an eager, curious antiquary, uncritical and the subject of many hoaxes.

Barrington, George, Irishman, noted author and notorious thief: b. 1755; d. about 1840. His most notable act of thieving was the robbing of a Russian prince in Covent Garden Theatre. He took from him a gold snuff-box said to be worth \$150,000; but, as the prince refused to prosecute, he was dismissed from trial. In 1790 he was sentenced to seven years' penal servitude at Botany Bay; but having given information of an intended mutiny of the other convicts on the voyage, at the end of two years he was discharged, on the first warrant of emancipation ever issued. He was made superintendent of convicts, and later high constable at Paramatta. He was a wit, and of some literary genius. One couplet in a prologue he wrote for Young's play 'Revenge,' produced by the convicts on the opening of the Sydney Theatre, remains an enduring classic:

"True patriots we; for be it understood,
We left our country for our country's good."

He wrote also 'Voyage to Botany Bay' (1801), 'History of New South Wales' (1802), 'History of New Holland,' i. e. Australia (1808).

Barrington, John Shute, English lawyer and theologian: b. London, 1678; d. Becket, Berkshire, 14 Dec. 1734. He was created first Viscount Barrington in 1720. He was a disciple and friend of Locke, a friendship which is thought to have been brought about by the publication of his (Barrington's) work, 'The Interest of England,' etc. He was devoted to theology and wrote extensively in that science. His chief works have been collected under the title 'The Theological Works of the First Viscount Barrington.'

Barrington, Sir Jonah, Irish jurist: b. County Queens in 1760; d. Versailles, France, 3 April 1834. He became judge in the Court of Admiralty, and was a steady opponent of the Act of Union in 1800. As the result of several peculations, upon petition of both Parliamentary houses, he was deprived of his office, and in 1830 left England. He was the author of 'Personal Sketches' (1827); 'Historic Memoirs of Ireland' (1832); 'The Rise and Fall of the Irish Nation' (1833), etc.

Barrington, William Wildman, English statesman, second Viscount Barrington: b. 15 Jan. 1717; d. 1 Feb. 1793. He was sworn a member of the privy council in 1755, and in the same year accepted the office of secretary of war. In 1761 he was appointed chancellor of the exchequer, but in 1765 reassumed the post of secretary of war, which he held till 1778, when, in consideration of long public and personal services, he was retired.

Barrington, Can., a seaport of Nova Scotia in Shelburne County, 173 miles west of Halifax by rail. Its industries are ship-building,

fishing, and the shipping trade. A United States consul resides here. Barrington Passage is a small fishing suburb. Pop. 1,900.

Barrios, bar're-ös, Gerardo, Central American statesman: b. about 1810; d. 1865. He became president of Salvador in 1860. During his administration, education, commerce, and public works progressed remarkably, his presidential management being unusually liberal. He was deposed by Duenas as the outcome of the war with Guatemala, and, while endeavoring to bring about a revolution in order to become president again, was captured and executed.

Barrios, Justo Rufino, Guatemalan statesman, of Spanish-Indian blood: b. San Lorenzo, Guatemala, 17 July 1835; d. Chalchuapa, 2 April 1885. He was educated for the law, but the political punishment of his father led him to become a guerrilla revolutionist, and finally chief lieutenant of Garcia Granados, who by his help ousted Vicente Cerna (the decisive battle being fought 29 June 1871) and became president, Barrios being commander-in-chief. The revolution was a democratic and anti-clerical one, and the new government began by expelling the Jesuits, to which Barrios added the suppression of religious orders during an acting presidency, and after he had, on 4 June 1873, succeeded Granados as president. There had been incessant revolts of the reactionists, which shortly after his accession he quelled once for all, establishing a system of terrorism and espionage which at least gave the country quiet and enabled him to carry out his wonderful reforms and improvements. He maintained internal peace, and supremacy in Central America, by a thorough system of militia drill for all but the pure-blooded Indians; keeping an army of some 30,000 men in constant reserve, with 3,000 to 4,000 in the capital, which he made one of the best ordered cities of Spanish America. He reorganized the postal and organized the telegraphic service also on the reports of men sent to examine the United States systems. He built the first telegraph and the first railroad in Guatemala, and started a line to the coast, compelling every citizen earning over \$8 a month to hold stock in it; constructed street railway lines in the capital; improved the roads and built solid bridges. He remodeled the educational system, established collegiate institutes, normal and industrial schools, and made knowledge of French and English a condition of license to practise law or medicine. He built two modern penitentiaries. In a word, he transformed Guatemala into one of the most habitable and progressive countries south of the United States. But the foremost purpose of his life was to form Central America into one united state, for power and prosperity and the ending of the miserable wars that wasted its vitality. On 15 Jan. 1876 he assembled a diet from all the states in Guatemala city to frame a plan of consolidation; but as it could not agree upon one, he therefore determined to set up governments in the other states favorable to his plans. Honduras was racked by a civil war and offered no difficulties, Salvador was too small to resist the union of the two, and thenceforward till 1884 Barrios disposed of the resources of all three republics. On 1 March 1880, the first constitution of Guatemala went into operation, and Barrios was re-elected for a

six-year term. On 24 Feb. 1883 he issued a circular to the liberal party, pledging himself to effect the unification only by peaceful means and with the consent of all the republics. In March 1884 he called a meeting of five delegates from each republic, but Costa Rica and Nicaragua still held back. Finally, on 28 Feb. 1885, he with his assembly, issued a decree proclaiming the union of the five states, relying on Honduras and Salvador to help him put down resistance in the others. But the president of Salvador refused to employ force, and on Barrios persisting, joined Nicaragua and Costa Rica in a league to resist him, appealing to Mexico and the United States for help. President Diaz of Mexico remonstrated with Barrios, and the United States viewed the movement with disfavor; but on the Salvador troops, which expected Mexican help, invading Guatemala, Barrios drove them back into Salvador, and while entering Chalchuapa was struck down by a sharpshooter's bullet. His widow removed to New York, and his son became a cadet in the United States army.

Bar'rister, in England, an advocate or pleader, who has been admitted by one of the Inns of Court, namely, the Inner Temple, Middle Temple, Lincoln's Inn, or Gray's Inn, to plead at the bar. Before a student can be admitted to the bar he must have been a member of one of those societies, and have kept 12 terms there by dining sufficiently often in the hall of the society to which he belongs, and must also pass a public examination. The examinations, which had dwindled into mere forms, have in recent years been made more stringent. Barristers are sometimes called utter or outer barristers, to distinguish them from queen's (or king's) counsel, who sit within the bar in the courts, and are distinguished by a silk gown. Barristers are also spoken of as counsel, as in the phrase opinion of counsel, that is, a written opinion obtained from a barrister before whom the facts of a case have been laid. The duties of a barrister are honorary, and he can maintain no action for his fees. It is the barristers who speak before all the higher courts, being instructed in regard to the facts of the case they have in hand by means of the brief which they receive from the solicitor engaging their services. In the United States there is no distinct order of counsel corresponding to the English barrister, the same person performing the duties of attorney, solicitor, counsel, or advocate. See also **ADVOCATE**.

Barron, James, American naval officer: b. Virginia, 1769; d. 21 April 1851. He entered the navy in 1798, and commanded the Chesapeake in 1807, when it was attacked by the British ship *Leopard* as a result of his refusal to allow the Chesapeake to be searched for deserters. The Chesapeake, which was quite unprepared, discharged one gun previous to striking her colors. She was captured and three alleged deserters were found. Barron was court-martialed for neglect of duty, though only partially to blame for the surrender of his vessel, and suspended for five years. The court closed its finding on the subject of the personal conduct of the accused, in the following language: "No transposition of the specifications, or any other modification of the charges themselves, would alter the opinion of the court as to the

firmness and courage of the accused; the evidence on this point is clear and satisfactory." Such was the fate of Commodore Barron, but it is more than probable that under the state of public feeling, demanding a victim, those who were really responsible for the efficiency of the Chesapeake, escaped unpunished. Upon his restoration, as the outcome of a long correspondence with his personal enemy, Commodore Decatur, a duel was fought and Decatur was killed. Barron became senior officer in the navy in 1839, though never again in active service and never regained full public esteem. See **CHESAPEAKE AND LEOPARD**.

Barron, Samuel, American naval officer: b. Hampton, Va., 1763; d. 29 Oct. 1810. In 1805 he commanded a squadron of 10 vessels in the expedition against Tripoli. On his return to the United States he was appointed commandant of the Gosport Navy Yard, but died immediately afterward.

Barros, bār-rōs, Arana Diego, Chilean scholar and historian: b. Santiago, 16 Aug. 1830. Ill health obliging him to give up legal studies, he early devoted himself entirely to historical and literary pursuits, and soon became an authority on the history of his native country. The favor with which his historical sketch of the campaigns of 1818-21 was received encouraged him to begin an extensive 'History of Chilean Independence' (1854-8). He spent several years investigating the government archives and private libraries of South America and Europe in search of material bearing on the history of South America. His chief works in addition to the above are: 'Vida y Viajes de Hernando de Magallanes' (1864); 'Histoire de la Guerre du Pacifique' (1881), written by order of the government; and his monumental 'Historia General de Chile' (12 vols. 1884-93). In Simancas he discovered the manuscript of the 'Purén Indomito,' an historical poem on the Araucanian war, and published an edition of it at Leipsic in 1860.

Barros, João de, eminent Portuguese historian: b. Viseu, 1496; d. Pombal, 1570. His first work, an historical romance, entitled the 'Emperor Clarimond,' appeared in 1520. Barros presented it to the king, who urged him to undertake the history of the Portuguese in India, which was issued 1552-62. King John III. appointed Barros governor of the Portuguese settlements in Guinea, and afterward general agent for these colonies. In 1530 he presented Barros with the province of Maranhão in Brazil for the purpose of colonization. Barros lost a great part of his fortune by the enterprise, and returned the province to the king, who indemnified him for his losses. His work 'L'Azia Portugueza,' is much admired for its style and erudition. He wrote besides a moral dialogue, 'Rhopiancuma,' in which he shows the pernicious consequences of accommodating principles to circumstances; but this work was prohibited by the Inquisition. He wrote also a dialogue on false modesty, and a Portuguese grammar, the first ever published.

Barro'sa, or Borosa, a village in Spain, near the southwest coast of Andalusia, 16 miles south-southeast of Cadiz. On a knoll to the east of it a battle was fought in 1811, in which the British under Gen. Graham, when abandoned by the Spaniards, defeated a superior

French force under Victor. No decisive results were obtained from the battle, however.

Barrot, ba-rō, **Camille Hyacinthe Odilon**, French statesman: b. Villefort, Lozère, 19 July 1791; d. Bougival, near Paris, 6 Aug. 1873. At 19 he pleaded before the ordinary tribunals, and at 23, by a special dispensation, before the Court of Cassation, Paris, and early acquired a high reputation for eloquence. In the political arena his oratory soon made him one of the most influential leaders of the liberal opposition. He became president of the "Aide-toi" Society in 1830, and at the July revolution in that year was one of three commissioners appointed to conduct the dethroned Charles X. to Cherbourg, on his way to England. Returning he was appointed prefect of the department of the Seine and member of the Council of State, but in a few months resigned his offices to lead the opposition to Casimir Périer and the reactionary ministers who followed him. He supported Thiers from his accession to office in March 1840, to his fall in October, when he resumed his opposition to the ministry of Guizot. He took a conspicuous part in the reform movement of 1847, and spoke eloquently at several of the provincial reform banquets which led to the revolution of February 1848. Made president by Thiers in his short-lived ministry, he advised the king to withdraw his troops and thus remove the last obstacle to the downfall of his throne. In the last sitting of the Chamber of Deputies he supported the claim of the Count de Paris to the throne and the regency of the Duchess of Orleans. The February revolution considerably abated his ardor for public liberty. He held office for some time under the presidency of Louis Napoleon, but retired from active political life after the *coup d'état*, 2 Dec. 1851, and accepted no office under the Second Empire. In July 1872 he was made a counselor of state and vice-president of the council, 6 Aug. 1873. His 'Mémoires Posthumes' appeared at Paris (1875-6).

Barrow, **Frances Elizabeth**, American author: b. Charleston, S. C., 22 Feb. 1822; d. 7 May 1894. She was educated in New York, where she was married to James Barrow. She wrote, under the name of AUNT FANNY, numerous books for children; among them 'Six Nightcaps,' which has been translated into French, German, and Swedish. Another, 'The Letter G' (1864), was widely known and very popular. She also wrote a novel, 'The Wife's Stratagem.'

Barrow, or **Borrowe**, **Henry**, English ecclesiastical reformer, often considered as one of the founders of Congregationalism: d. 1593. He was a member of Gray's Inn, London, in 1576 and there became interested in the writings of Thomas Browne, the founder of the Brownists. On account of his advocacy of Church reform he was imprisoned and with his co-reformer, Greenwood, was hanged at Tyburn. He was the author of 'Brief Discourse of the False Church' (1590). See Dexter, 'Congregationalism of the Last Three Hundred Years' (1880).

Barrow, **Isaac**, eminent English mathematician and theologian: b. London, 1630; d. May 1677. At the Charterhouse, where he was educated, he was chiefly remarkable for fighting

and neglect of study, but being removed to a school at Felsted, in Essex, he began to show some earnest of his future great reputation. He was subsequently entered a pensioner of Trinity College, Cambridge, in 1645, of which he was chosen a scholar in 1647. The ejection of his uncle, the Bishop of St. Asaph, from his fellowship of Peterhouse, in consequence of his adherence to the royal party, and the great losses sustained by his father in the same cause, left him largely unprovided for. His good disposition and great attainments, however, so won upon his superiors that, although he refused to subscribe to the Covenant, he was very highly regarded. Finding that opinions in church and state opposite to his own now prevailed, he proceeded some length in the study of anatomy, botany, and chemistry, with a view to the medical profession. He, however, changed his mind, and to the study of divinity joined that of mathematics and astronomy. In 1652 he graduated M.A. at Oxford, and being disappointed in his endeavor to obtain the Greek professorship at Cambridge, engaged in a scheme of foreign travel. He set out in 1655, and during his absence his first work, an edition of Euclid's 'Elements,' was published at Cambridge. He visited France and Italy, where he embarked for Smyrna, and from Smyrna he proceeded to Constantinople, returning in 1659 by way of Germany and Holland, and was soon after episcopally ordained by Bishop Brownrigg. In 1660 he was elected Greek professor at the University of Cambridge, without a competitor. The following year he received the degree of B.D. He was in 1662 chosen professor of geometry in Gresham College, and in 1663 the Royal Society elected him a member of that body in the first choice after their incorporation. The same year he was appointed the first Lucasian professor of mathematics at Cambridge, on which occasion he delivered an excellent prefatory lecture on the utility of mathematical science. In 1669, on a conscientious principle of duty, he determined to give up mathematics and adhere exclusively to divinity. Accordingly, after publishing his celebrated 'Lectones Opticæ,' he resigned his chair to the great Newton. In 1670 he was created D.D. by mandate, and in 1672 the king nominated him to the mastership of Trinity College, observing that he had bestowed it on the best scholar in England. He had before this refused a living, given him with a view to secure his services as a tutor to the son of the gentleman who had it to bestow, because he deemed such a contract simoniacal; and he now, with similar conscientiousness, had a clause in his patent of master allowing him to marry, erased, because incompatible with the intentions of the founder. In 1675 he was chosen vice-chancellor of the University of Cambridge; but the credit and utility expected from his labors were frustrated by his untimely death.

The works of Barrow, both mathematical and theological, are of the highest class. Of the former the following are the principal: 'Euclidis Elementa' (1655); 'Euclidis Data' (1657); 'Lectones Opticæ' (1669); 'Lectones Geometricæ' (1670); 'Archimedis Opera' (1675); 'Apollonii Conicorum, lib. iv.'; 'Theodosii Sphericorum, lib. iii., novo methodo illustrata et succincte demonstrata' (1675); 'Lectio in qua Theoremata Archimedis de Sphæra et

BARROW — BARROW-IN-FURNESS

Cylindro per Methodum Indivisibilium Investigata, etc.' (1678); *'Mathematicæ Lectiones'* (1683). All his English works are theological; they were left in manuscript, and published by Dr. Tillotson (1685). *'Isaaci Barrow Opuscula'* appeared in 1697. As a mathematician, especially in the higher geometry, Barrow was deemed inferior only to Newton; as a divine he was singularly distinguished for depth and copiousness of thought. A fine specimen of his characteristic copiousness is quoted by Addison from his sermon on *'Vain and Idle Talking,'* in which the various forms and guises of wit,—a faculty for which Dr. Barrow was himself celebrated,—are enumerated with a felicity of expression which it would be difficult to parallel.

Barrow, Sir John, eminent English traveler and geographer; b. near Ulverstone, Lancashire, 1704; d. 23 Nov. 1848. When 14 years old he entered an iron foundry in Liverpool as clerk and overlooker. Two years afterward he gave up this situation and made a voyage in a whaler to Greenland. He was subsequently employed as a teacher of mathematics in a school at Greenwich, and in that capacity attracted the attention of Sir George Staunton, who appointed him nominally comptroller of the household to Lord Macartney in his embassy to China in 1792, though his real employment was to take charge of the philosophical instruments carried out as presents to the Chinese emperor. Of this journey he afterward published an account under the title of *'Travels in China'* (1804). On Lord Macartney being appointed governor of the Cape of Good Hope in 1797, he made Mr. Barrow his private secretary; and on quitting the Cape in 1798 left him auditor-general of public accounts. During his residence there he made several journeys into the interior of South Africa, and on his return to England published an account of them under the title of *'Travels in Southern Africa.'* In 1804 Barrow was appointed second secretary to the admiralty. The duties of this post he discharged with the most exemplary industry and activity, and he took an ardent interest in promoting geographical and scientific discovery, and more especially the expeditions to the Arctic Seas. His leisure hours were employed in literary work, and the numerous volumes published by him attest the profitable use he made of his time. These include, in addition to the books of travel already mentioned, the *'Life of Earl Macartney'* *'Life of Lord Anson'*; *'Life of Lord Howe'*; *'Voyages of Discovery and Research within the Arctic Regions'*; *'Autobiographical Memoir'* (1847) *'Sketches of the Royal Society.'* In 1835 he was created a baronet, and in 1845 retired from his office at the admiralty. He originated the Royal Geographical Society in 1830 and was its vice-president at the time of his death. Barrow Strait, Cape Barrow, and Point Barrow, in the Arctic regions, were named in his honor.

Barrow, a navigable river of Ireland, province of Leinster. Its course is generally southward, and after about 900 miles it joins the Suir to form the estuary called Waterford Harbor. It is navigable for vessels of 200 tons to New Ross, 25 miles from the sea, and for barges to Athy in Kildare County, where it is joined by a branch of the Grand Canal.

Barrow, Cape or Point, a term applied to three prominent localities of the Arctic region, in honor of Sir John Barrow. (1) Point Barrow, on the north coast of Alaska, in lat. 71° 23' N., and lon. 156° 31' W., long considered as the most northerly spot on the American mainland. (2) Cape Barrow, on the coast of Canada, or Coronation Gulf, is in lat. 68° N., lon. 111° W. (3) Barrow Strait, the earliest of Parry's discoveries, leading to the west out of Lancaster Sound, which Parry's immediate predecessor, Captain, afterward Sir John Ross, had pronounced to be landlocked in that direction. Besides its main course to Melville Sound, Barrow Strait throws off Prince Regent's Inlet to the south and Wellington Channel to the north. The passage averages about 50 miles in breadth, extending nearly along the parallel of 74° N., from 85° to 100° W.

Barrow, an artificial mound or tumulus of stones or earth, piled up over the remains of the dead. Such erections were frequently made in ancient times in our own land, and they are met with also in many other countries both in the Old and New World. In Scotland they are called cairns. When opened they are often found to contain stone cysts, calcined bones, etc. Burial in barrows, commencing amid the mists of remote antiquity, seems to have been practised as late as the 8th century A.D. One of the finest barrows in the world is Silbury Hill, Wiltshire, near Marlborough. It is 170 feet in perpendicular height, 316 along the slope, and covers about five acres of ground. See also MOUND BUILDERS.

Barrow-in-Furness, an English seaport, and county borough, in the district of Furness, situated opposite to and including the island of Walney, Lancashire. In 1848 or 1849 it was but a hamlet with 100 inhabitants, whose chief support was fishing; in 1901 its population was 57,584. This extraordinary prosperity is due to the working of the rich mines of red hematite iron-ore which abounds in the district, and to the extension of the railway to Barrow, by which its excellent natural position and capabilities of development as a seaport have been taken advantage of. There are now four docks completed, and the depth of water is sufficient to admit the largest ships at present afloat. Much timber is imported from the north of Europe and from Canada and Norway, large numbers of cattle are brought from Belfast, and an extensive trade is done in grain and flour. Iron-ore and pig-iron are largely shipped from the port. There is a large passenger traffic with the Isle of Man and Belfast. The chief industrial occupations are the manufacture of iron and Bessemer steel, ship-building, iron-founding, and the making of ropes, sails, bricks, and large jute-works, paper-pulp works, and salt-works have been established. Barrow owes a great deal of its prosperity to the discovery of the Bessemer process of steel-making, and to the fact that the hematite ores of the district are specially adapted to this process. The yearly output of pig-iron is said to be 350,000 tons, with 200,000 tons of Bessemer and Siemens-Martin steel. Messrs. Vickers, Sons, and Maxim, Limited, employ some 8,000 persons, and have built some of the largest merchant and war-vessels afloat. They also manufacture ordnance. The town is laid out on a regular

BARROWS — BARRY

plan, mostly in rectangles, is substantially built, and well drained and supplied with gas, water, and electricity. It contains churches, chapels, and schools for the various denominations, a free public library, workmen's institute, and a town-hall, built at a cost of over £60,000. The Redistribution Act of 1885 erected it into a parliamentary borough, returning one member. The interesting ruins of Furness Abbey, which was founded in 1127, lie within two miles of the town.

Barrows, Elijah Porter, American clergyman and educator: b. Mansfield, Conn., 1807; d. 1888. He was professor of sacred literature in Western Reserve College, Ohio, 1837-52, and of Hebrew in Andover Theological Seminary, 1853-66. In 1872 he became professor of Hebrew at Oberlin College, Ohio. Beside many contributions to the 'Bibliotheca Sacra,' he published 'Companion to the Bible' (1867); 'Sacred Geography and Antiquities' (1872); 'Manners and Customs of the Jews' (1884).

Barrows, John Henry, American educator: b. Medina, Mich., 11 July 1847; d. Oberlin, Ohio, 3 June 1902. He was graduated at Olivet College in 1867; subsequently studied in Yale College, Union and Andover Theological Seminaries, and at Gottingen; was pastor of the First Presbyterian Church, in Chicago, for 14 years; organized and was president of the World's Parliament of Religions, at the World's Columbian Exposition in Chicago, in 1893. He delivered a course of lectures on Christianity in the principal universities in India, under the patronage of the University of Chicago, 1896-7, and became president of Oberlin College in 1898. He published 'The Gospels are True Histories' (1891); 'Life of Henry Ward Beecher' (1893); 'Christianity the World Religion'; 'The World Pilgrimage'; 'History of the Parliament of Religions' (1893); 'The Christian Conquest of Asia,' (1899).

Barrows, Samuel June, American clergyman and author: b. New York, 26 May 1845. After a varied early career he became private secretary to William H. Seward in 1867, went to Utah in 1870 with Chaplain Newman of the United States Senate, and reported the debate with the Mormons. He was graduated at Harvard Divinity School in 1875, and while an undergraduate accompanied as correspondent of the New York *Tribune* Gen. Stanley's Yellowstone expedition in 1873, and Gen. Custer's Black Hills expedition in 1874, taking part in the battle of the Big Horn. He was pastor of the First Unitarian Church, Dorchester, Mass., 1876-81; editor of the *Christian Register* (1881-97); secretary of the United States delegation to the International Prison Congress, Paris, 1895; and United States representative on the International Prison Commission, 1896. In 1897 he was elected to Congress from the 10th Massachusetts district. He has written 'The Doom of the Majority of Mankind' (1883); 'Shaybacks in Camp'; 'Crimes and Misdemeanors in the United States'; 'A Baptist Meeting House'; 'Isles and Shrines of Greece' (1898).

Barrundia, bär-roon'de-a, José Francisco, Central American statesman: b. Guatemala, 1779; d. New York, 4 Aug. 1854. He was sentenced to death for treason in 1813, but escaped, and became leader of the Revolutionary Party, in 1819. In 1823-4, as a member of the

Constitutional Convention of Central America, he brought forward the decree for the abolition of slavery. He became president of the Central American Republic in 1829; retaining office for over a year, and in 1852 was again elected president. He came to the United States in 1854, as minister from Honduras, to propose the annexation of that territory to the United States, but died suddenly before anything was accomplished.

Barry, Alfred, English prelate: b. London, 15 Jan. 1826. He was a son of the architect Sir Charles Barry, and was educated at Cambridge. He was headmaster of Leeds grammar-school, 1854-62; principal of Cheltenham College, 1862-8, and of King's College, London, 1868-83. He was canon of Worcester, 1871-81, of Westminster 1881-4. He became primate of Australia and bishop of Sydney in 1884, but resigned his see in 1889 and returning to England was rector of St. James, Piccadilly, London, 1895-1900. He has published 'Introduction to the Old Testament' (1850); 'Life of Sir C. Barry' (1867); 'Boyle Lectures' (1876-8); 'Christianity and Socialism' (1891); 'England's Mission to India' (1894); 'Hulsean Lectures' (1895).

Barry, Ann Spranger, English actress: b. Bath, 1734; d. London, 1801. She was several times married. Her first great success was in the character of Cordelia, at Drury Lane, London (1767). Her farewell was as Lady Randolph, at Covent Garden (1797). Equal to Mrs. Woffington and Mrs. Cibber in tragedy, she surpassed them both in comedy. As Desdemona she had, during her whole career, no competitor. She is buried in Westminster Abbey.

Barry, Sir Charles, distinguished English architect: b. London, 23 May 1795; d. May 1860. At a very early age he displayed a taste for drawing and design, and while a youth, exhibited at the Royal Academy. Having resolved to devote his energies to architecture, he employed the little property left him in visiting Italy, Greece, and the East. He left England in 1817, and remained abroad upward of three years. After his return he entered on his professional career. He executed numerous important buildings, such as the Traveler's and Reform Club-houses, London; St. Edward's School, Birmingham, etc.; and in 1836 was appointed architect of the new Houses of Parliament at Westminster. On this building his fame as an architect rests, and with its execution he was employed almost uninterruptedly to the day of his death, extending over a period of more than 24 years. In 1852 he received the honor of knighthood. He had been admitted a Royal Academician in 1841. As an architect he belonged to the eclectic school, and adopted indifferently the Gothic or classic styles according as he might be required or circumstances rendered it expedient.

Barry, Edward Middleton, English architect, son of Sir Charles Barry: b. 1830; d. 1880. He had already distinguished himself in his profession, and succeeding to his father's business, completed his great work the Houses of Parliament. He designed a large number of buildings, many of them of national magnitude and importance, such as the Covent Garden Theatre, the opera house at Malta, and the New

BARRY

National Gallery in London. He was elected a Royal Academician in 1869, and in 1873 succeeded Sir G. G. Scott as professor of architecture to the Academy.

Barry, Elizabeth, English actress: b. 1658; d. London, 7 Nov. 1713. She was said to be the daughter of Col. Barry, a prominent royalist in the civil war. She made her debut on the stage under the patronage of the Earl of Rochester; and her first performance is said to have been witnessed by Charles II. and the Duke and Duchess of York. Her reputation was won chiefly in the line of tragedy, in the roles of Monimia and Belvidera. She was known as 'the great Mrs. Barry'; and is said to have created over 100 roles. See Galt, 'Lives of the Players' (1831).

Barry, James, Irish painter and writer on his art. b. Cork, 11 Oct. 1741; d. 12 Feb. 1806. By one of his first paintings in oil, 'The Conversion of St. Patrick,' exhibited at Dublin, he attracted the attention of Burke, who carried him, in his 23d year, to London. The brothers Burke provided him with the means for visiting Paris and Rome, whence he went to Florence, Bologna, and Naples. He remained about four years in Italy, returning in 1770. Having exhibited some important pictures he was elected an associate of the Royal Academy in 1772, and a full academician the following year. In 1777-83 he executed his chief work, the paintings which adorn the great hall of the Society of Arts. In 1775 he published 'An Inquiry into the Real or Imaginary Obstructions to the Increase of the Arts in England.' He was appointed professor of painting to the Academy in 1782; but in 1799, after he had alienated the respect of his fellow-academicians by his peculiar manners, and by his savage attacks upon them, he was expelled on the occasion of a violent pamphlet issued by him under the title of a 'Letter to the Society of Dilettanti.' He was distinguished more by vigor of conception than by accuracy of execution, and his paintings have not maintained their reputation.

Barry, John, the first American commodore: b. Wexford, Ireland, 1745; d. Philadelphia, 13 Sept. 1803. He early displayed a great partiality for the sea, and at the age of 11 adopted America as his home, and made a number of voyages in merchant ships, until the commencement of the Revolution. He at once embraced the cause of the colonies, offered his services, and was one of the first officers commissioned by Congress in the naval service. After a successful cruise in the Lexington, he was transferred, in the latter part of 1776, to the Effingham, one of three large frigates built in Philadelphia. When the American vessels of war were lying near Whitehill, whither they had been sent when the city and the forts of the river had fallen into the power of the British, Commodore Barry conceived the daring plan of annoying the enemy by means of small boats, properly armed, which being stationed down the river and bay might intercept supplies, and in case of danger take refuge in the creeks. He accordingly manned the boats of the frigates, descended the river with muffled oars under cover of the night, and appeared unexpectedly before the city. He effected his object by intercepting a large stock of provisions, and capturing several vessels laden with mili-

tary munitions and valuable stores for the British officers. He was afterward transferred to the Alliance, a frigate of 36 guns, which was placed under his orders. 25 December 1781 the Alliance sailed from Boston with the Marquis de la Fayette and Count de Noailles on board, who were proceeding to France on public business. During the rest of the war Barry served with credit to himself and benefit to his country, and after the cessation of hostilities, was appointed to superintend the building of the frigate United States in Philadelphia, which was designed for his command. He retained the command of the United States until she was laid up in ordinary.

Barry, John Arthur, Australian journalist: b. 1850. He led a roving life for many years, but finally settled in Sydney, N. S. W. His writings include: 'Steve Brown's Bunyip' (1893); 'The Great Deep' (1895); 'The Lack of the Native Born' (1898); 'A Son of the Sea' (1899); 'Against the Tides of Fate' (1899); 'Old and New Sydney' (1901); 'Red Lion and Blue Star' (1902).

Barry, John Daniel, American novelist: b. Boston, Mass., 31 Dec. 1866. He has written 'A Daughter of Thespis'; 'The Intriguers'; 'Mademoiselle Blanche'; 'The Princess Margarethe, a Fairy Tale'; etc.

Barry, Sir John Wolfe, English engineer of eminence, youngest son of Sir Charles Barry: b. London, 7 Dec. 1836. He built the present Blackfriars Bridge in London, the Tower Bridge, the Barry Dock at Cardiff, and planned the railway in Argentina from Buenos Ayres to San Rosario. He has published 'Railway Appliances' (1876); 'Lectures on Railways and Locomotives' (1882); 'The Tower Bridge' (1894).

Barry, Martin, English physiologist: b. Fratton, Hampshire, 1802; d. Beccles, Suffolk, April 1855. He studied at the medical schools of London, and at several on the Continent, and took his degree of M.D. in Edinburgh, in 1833. He wrote much on physiological subjects, and especially on animal development and embryology. He was elected a member of the Royal Society in 1840. In 1844 he was appointed house-surgeon to the Royal Maternity Hospital, Edinburgh. His means being ample, he gave his professional services largely to the poor.

Barry, Patrick, American horticulturist: b. near Belfast, Ireland, May 1816; d. Rochester, N. Y., 23 June 1890. He came to the United States at 20 and settled at Rochester in 1840. He was a member of the nursery firm of Elwanger & Barry. He published a much valued work called 'The Fruit Garden,' and at various times edited the 'Horticulturist' and the *Gene-see Farmer*.

Barry, Spranger, Irish actor, the great rival of Garrick: b. Dublin, 1719; d. London, 1777. He was brought up as a silversmith; but was attracted to the stage. He first appeared (1744) at the Theatre Royal, Smock Alley, Dublin; and in 1746 was engaged at Drury Lane, London, as alternate to Garrick, in 'Hamlet' and 'Macbeth.' Having aroused Garrick's jealousy by his success as Romeo, he was engaged (1749) at Covent Garden, where his supremacy in 'Romeo and Juliet' was generally

BARRY — BARTAS

conceded. He spent 1754-66 trying to found a theatre at Dublin. In 1767 he reappeared at London in the part of Othello. From 1774 till his death he acted at Covent Garden. He is buried in Westminster Abbey.

Barry, Thomas Henry, American soldier: b. New York, 13 Oct. 1855. He graduated at West Point, 1877, and passed through the various grades of the service to his appointment as brigadier-general, United States volunteers, 18 June 1900. From August 1898 to February 1900 he was adjutant-general of the 8th army corps in the Philippines, and became chief of staff, Division of the Philippines, 14 Nov. 1900.

Barry, William Farquhar, American military officer: b. New York, 18 Aug. 1818; d. 18 July 1879. He first saw active service in the Florida war (1852-3), and in the Mexican war acted as aide-de-camp to Gen. Worth. At the outbreak of the Civil War he was made chief of artillery, and organized the artillery of the Army of the Potomac. He subsequently became chief of artillery to Sherman, and took part in the march to the sea. In 1865 he was brevetted major-general. In 1867 he had charge of the Artillery School at Fort Monroe. He was part author with J. G. Barnard of 'Engineer and Artillery Operations of the Army of the Potomac, 1861-2,' and of 'Tactics for the Field Artillery of the United States.'

Barry, William Francis, English Roman Catholic priest, theologian, and novelist: b. London, 21 April 1849. He was educated at Oscott and the English College, Rome; was professor of philosophy at Birmingham Theological College, 1873-7; professor of divinity at Oscott, 1877-80; and has been rector of a parish in Dorchester, Oxfordshire, from 1883. Besides writing much on metaphysical themes in English reviews, he is the author of several brilliant novels, including: 'The New Antigone' (1887); 'The Place of Dreams' (1894); 'The Two Standards' (1898); 'Arden Mas-siter' (1900); 'The Wizard's Knot' (1901). He has also published 'The Papal Monarchy' (1902).

Barry, William Taylor, American statesman: b. Lunenburg, Va., 5 Feb. 1784; d. Liverpool, England, 30 Aug. 1835. He graduated at William and Mary College (1803), and was soon after admitted to the bar. In 1810 he became a member of Congress from Kentucky. He served in the War of 1812; and from 1814-16 was United States senator from Kentucky. In 1828 he was appointed postmaster-general under Jackson; and was on his way abroad as minister to Spain at the time of his death. He was the first postmaster-general who had a seat in the Cabinet.

Barry Cornwall. See PROCTER, BRYAN WALLER.

Barry, a seaport and railway terminus of south Wales, county of Glamorgan, seven miles southwest of Cardiff. It has been practically brought into existence by the construction (1884-9) of a dock of 70 acres area here, between Barry Island and the mainland, at a cost of about £850,000, the entrance being between two breakwaters respectively 2,600 and 700 feet in length. Barry possesses churches and chapels, market-hall, public-hall, seamen's institute, etc.,

and carries on a large export trade in coal. As a municipality it is markedly progressive. Pop. (1901) 27,000.

Barry Lyndon, the best of Thackeray's shorter novels. It was originally written as a serial for 'Fraser's Magazine,' and was published in book form in 1844. It is cast in the form of an autobiography. The hero is an Irish gambler and blackleg, but of audacious courage and of picturesque versatility. He tells his story in a plain matter-of-fact way, without concealment or sophistication, glorying in episodes which would seem shameful to the most rudimentary conscience, and holding himself to be the best and greatest but most ill used of men.

Barrymore, Maurice, American actor: b. India, 1847, and educated at Cambridge. Having gone upon the stage he came to America and made his first appearance in 1875. Since then he has been most of the time in this country, acting as leading man with Modjeska, Mrs. Langtry, Mrs. Bernard Beere, and Olga Nethersole. He has also written several plays, among them 'Nadjeska.'

Bar'sabas, the son of Alpheus, brother of James the Less and of Jude, and one of the candidates nominated for the apostolical office left vacant by the treachery and suicide of Judas. According to tradition he was afterward appointed bishop of Eleutheropolis, a town of Palestine, about 20 miles from Jerusalem, and suffered martyrdom. Another Barsabas, surnamed Judas, and supposed to be the brother of the above, is mentioned in the Acts as one of the companions of Paul and Barnabas when they went to preach the gospel at Antioch. He is supposed to have returned to Jerusalem, and died at a very advanced age.

Barsu'ma, or **Barsumas**, Nestorian bishop who flourished in the 5th century. He became bishop of Nisibis and Metropolitan in 435. He established a theological school which sent out many missionaries, and is regarded as the founder of the Nestorian faith in Persia and eastern Asia.

Bartan, bār-tān', a town of Asia Minor, at the junction of the river Bartan and a smaller stream, the former navigable for small vessels entering the Black Sea a few miles below. It is surrounded by a ruinous wall, and consists of about 800 houses, built on two low hills of cretaceous limestone. The houses, on account of the marshy character of the surrounding country, are all built of two stories, only the upper one of which is inhabited. For the same reason the streets are carefully paved with large limestone slabs. It has several mosques, khans, and baths; and carries on an active trade with Constantinople, from which it imports various kinds of merchandise, sending in exchange hemp, fruit, and building-timber. Pop. 4,000.

Bartas, bār-ta, **Guillaume de Salluste du**, French soldier, diplomatist, and man of letters: b. Montfort, 1544; d. 1590 of wounds received at the battle of Ivry. His chief poem, 'The Divine Week,' gives an account of the creation, and is said to have had a considerable influence on Milton's 'Paradise Lost.' Thirty editions of the work passed through the press in six years. Joshua Sylvester (1563-1618) translated

into English 'Du Bartas, His Divine Weeks and Works' (1598). Mrs. Anne Bradstreet, the earliest American woman of letters, was an ardent admirer of his strained pedantic style and modeled her own verse upon it.

Bartenstein, bar'ten-stin, **Treaty of**, a treaty between Prussia and Russia against France, concluded at Bartenstein, Prussia, 26 April 1807, soon after the battle of Eylau. The objects of the alliance were to re-establish Prussia within the limits of 1805; to dissolve the Rhine Confederation; to restore Tyrol and Venice to Austria; to secure the co-operation of England and Sweden; to aggrandize Hanover at the expense of France; to restore the House of Orange; and to obtain from France indemnities to the kings of Sardinia and Naples. The terms of this alliance are chiefly important for their similarity to the terms offered Napoleon at Prague (1813). The town of Bartenstein has manufacturing interests of importance. Pop. (1900) 6,779.

Barter, a term used in commerce and political economy, to express the exchange of one commodity for another, as contrasted with the sale of commodities for money. It is simply a primitive form of exchange carried on in countries in which the use of money has not yet been introduced, or is not prevalent. It was an economic stage through which all communities must have passed. Even yet in many rude countries barter is very common; and European travelers find it convenient to take with them weapons, tools, and ornaments to exchange with the natives for their commodities. In civilized communities barter is a very exceptional thing, having been superseded by the use of money in various forms.

In law, barter, or exchange, as it is now more generally called in law books, is a contract for transferring property, the consideration being some other commodity; or it may be described as a contract for the exchange of two subjects or commodities. It thus differs from sale, which is a contract for the transference of property in consideration of a price in money. See also SALE.

Bartfeld, bart'fält, a town in Hungary, 156 miles northeast of Budapest, on a rising ground near the banks of the Tepla and Lauka. It is one of the oldest towns in Hungary, and is well built; has several Roman Catholic churches, a Lutheran church and school, a Franciscan monastery, military academy, hospital, theatre, paper-mills, potteries, etc. Some acidulous chalybeate springs and baths, near the town, are much frequented. The trade in wine, hemp, linen cloth, and woolen yarn is considerable. Pop. 5,069.

Barth, bart, **Auguste**, French Oriental scholar: b. in Strassburg, 22 May 1834. He is a member of the French Institute and his annual reports in 'Revue de l' Histoire des Religions' are much esteemed. His most important work is 'Les Religions de l' Inde' (1879; English translation 1882).

Barth, **Heinrich**, distinguished geographer and African traveler: b. Hamburg, 16 Feb. 1821; d. 25 Nov. 1865. He received his education partly in his native town, and partly at the University of Berlin, and having determined to explore all the countries bordering on the Mediterranean, set out with this intention

in the beginning of 1845. After his return in the end of 1847 he wrote an account of his travels, which he published with the title 'Wanderungen durch die Kustenlander des Mittelmeeres' (Berlin, 1849). In less than two years after his return from his first travels he was invited by the English government to join Dr. Overweg in accompanying the expedition that was about to proceed under James Richardson to Central Africa. The expedition having landed at Tripoli in the end of 1849, set out thence for the interior of Africa in February 1850. His explorations, which extended over an area of about 2,000,000 square miles, hitherto almost entirely unknown, were continued for more than five years, in spite of the death both of Richardson and Overweg, and he did not return to Tripoli till the autumn of 1855. The chief geographical results of these travels consist in the light they throw on the true nature of the Desert of Sahara, in showing that the eastern upper branch of the Niger, the Benuwe, is not connected with Lake Chad, and in the determination of the course of the Niger between Say and Timbuctoo. The result of these travels, entitled 'Travels and Discoveries in North and Central Africa,' was published in English (1857-8). Immediately after its publication he set out upon a new series of travels through the countries bordering on the Mediterranean, the last of which occupied the summer of 1865. Besides the works mentioned, he published 'Sammlung und Verarbeitung Central-afrikanischer Vokabularien' (1862-3).

Barth, or **Bart**, **Jean**, French seaman: b. Dunkirk, 20 Oct. 1650; d. there, 27 April 1702. He was the son of a fisherman, and at an early age evinced a love of adventure, which led him to follow the sea. He desired to enter the royal service, but at this period the lower classes were never commissioned in the French royal navy, and Barth was constrained to take the command of a privateer. In this position opportunities soon occurred for distinguishing himself, and his name became known to Louis XIV., who commissioned him to cruise in the Mediterranean. His bravery soon raised him in the favor of the king, and he was appointed captain of the squadron in 1697. France being now at war with the Dutch, a field was opened of which Barth was not slow to take advantage, and the most unexampled feats of daring soon made him the terror of his enemies. On one occasion, a famine existing in France, Barth recaptured from the Dutch 100 sail of vessels, loaded with grain. At another time when Dunkirk was blockaded, taking advantage of a fog, he sailed through the English and Dutch fleets, and destroyed 86 merchantmen: then making a descent near Newcastle, Northumberland, he destroyed 200 houses, and returned safely with property valued at 500,000 crowns. Barth was rough in manners, and entirely uneducated; indeed, he could with difficulty scrawl his own name; but he was as simple-minded and honest as he was brave. A statue to his memory, by David d'Angers, was erected at Dunkirk in 1845. See Badin, 'Jean Bart' (1867); Landelle, 'Jean Bart et son fils' (1874).

Barth, **Paul**, German sociologist: b. Baruthe, Silesia, 1 Aug. 1858. He is a professor in the University of Leipsic and in addition to his much-valued 'Philosophie der Ge-

BARTH — BARTHELEMY-SAINT-HILAIRE

schichte als Sociologie' (1897), is the author of 'Geschichte Philosophie Hegels und die Hegelianer bis auf Marx und Hartmann' (1890); 'Beweggründen des Sittlichen Handelns' (1889); 'Tiberius Gracchus' (2 ed. 1893).

Barth, a seaport of Prussia, in the province of Pomerania, northwest of Stralsund. Its chief industries are ship-building and fish curing and packing, and it has also a good trade in grain and wool. Its church dates from the 13th century. Pop. (1900) 7,100.

Barthélemy, bar-tâ-l'-me, **Auguste-Mar-seille**, French poet and politician: b. Marseilles, 1796; d. there, 23 Aug. 1867. Educated at the Jesuit College of Jully, he went to Paris in 1822, and soon made himself famous by a series of vigorous and pointed political satires in verse, directed against the Bourbons, and full of suggestive regrets for the glories of the empire. In 'Napoleon in Egypt' (1828), and still more in his elegy for Napoleon's son, 'The Son of the Man' (1829), he spoke out his imperialism more boldly, and the latter occasioned his imprisonment on the eve of the revolution of July. His liberation, of course, was immediate; and with his friend Méry, he celebrated the victory of the people in a poem dedicated to the Parisians, entitled 'The Insurrection.' During all the changes which followed, Barthélemy was indefatigable as a brilliant versifier on the political events of the day; though, in his later years, his popularity somewhat declined. He was, from the first, a warm supporter of the second Napoleonic régime. Some of his sayings are memorable, as the oft-quoted "L'homme absurde est celui qui ne change jamais." He died in Marseilles, of which city he was librarian.

Barthélemy, François, Marquis de, French diplomatist: b. Aubagne (Provence), 20 Oct. 1747; d. Paris, 3 April 1830. He was brought up by his uncle, the author of 'Anacharsis'; and the protection of the Duke of Choiseul established him in diplomacy. The Revolution did not hinder his success in life: in 1793 he was minister plenipotentiary to Switzerland. He successively negotiated the Peace of Basel with Prussia, Spain, and the elector of Hesse, the first treaties concluded by the French republic. This won for him an enviable reputation; but he was especially popular among the *Clichyens* or royalist party, by which he was, in 1797, elected member of the directory; consequently on the republican *coup d'état* of the 18th Fructidor, he was ejected from the government, arrested, and transported with Pichegru and Ramel, to Guiana, whence he escaped to the United States. Shortly afterward he was in England, and after the 18th Brumaire was recalled by the first consul, who made him a senator. On the establishment of the Empire he received the title of count and showed great devotion to Napoleon during the course of his prosperity, but as soon as misfortune threatened Barthélemy sided at once with his enemies. He was made a minister of state and a marquis by Louis XVIII. and in 1819 proposed the restriction of the electoral franchise.

Barthélemy, Jean Jacques, French anti-quarian: b. Cassis, near Marseilles, 20 Jan. 1716; d. 30 Jan. 1795. He received a good education from the fathers of the oratory at Marseilles, and was about to prepare himself, under the Jesuits, for holy orders; but becoming dis-

gusted with his teachers declined all offers of clerical promotion, and only accepted the title of *abbé*, in order to show that he belonged to this class. He became deeply interested in the study of Oriental languages and antiquities, and his indefatigable industry and acuteness soon enabled him to communicate to the learned new discoveries in this Oriental study, among which the 'Alphabet of Palmyra,' published 1754, holds a principal place. In 1747 he was chosen member of the Academy of Inscriptions at Paris. About this time he became acquainted with the Count Stainville (afterward the minister Choiseul), who was on the point of departing as ambassador for Rome, and invited Barthélemy to accompany him. Having been appointed director of the Cabinet of Medals in 1753, he accepted the offer and went, in 1754, to Rome. He traveled through Italy, collected antiquities, and occupied himself, after his return, with learned works and with the arrangement of the cabinet which had been intrusted to his care, and to which he added a great number of costly and rare medals. Among his works none are so distinguished for learning and beauty of description as the 'Travels of the Younger Anacharsis in Greece,' on which he had labored 30 years, and which was translated into English, German, and other languages. He himself was modest enough to call this an unwieldy compilation, but all the learned men of France and foreign countries received it with the greatest applause. Barthélemy, in his advanced age, resolved to compose a complete catalogue of the Royal Cabinet of Medals, but was interrupted in 1788 by the storms of the Revolution. In 1789 he received a place in the Académie Française. In 1793 he was arrested on a charge of aristocratic leanings, but was soon after set at liberty. When the chief librarian of the national library, the notorious Carra, was executed, 31 Oct. 1793, Barthélemy received the offer of his place but declined it.

Barthélemy-Saint-Hilaire, Jules, French politician and philosopher: b. Paris, 19 Aug. 1805; d. there, 25 Nov 1895. On completing his studies he received an appointment in the ministry of finance, being at that time also on the staff of the *Globe* newspaper. After the revolution of 1830 he founded a journal called *Bon Sens*, and continued to support the liberal party in the press. In 1834 he became examiner in French literature at the École Polytechnique, and four years later he was appointed to the chair of Greek and Latin philosophy in the Collège de France. He played a part on the side of the moderate party in the revolution of 1848, and was elected to the constituent assembly for Seine-et-Oise. The *coup d'état* of December 1852 caused him to forsake political life for a considerable time and to resign his professorship. From this retirement he emerged in 1869, the year of his election as deputy for the first circumscription of Seine-et-Oise. He was shortly afterward sent to the National Assembly as the representative of that department, and during the troublous times of 1870-1 he was closely associated with M. Thiers. In 1875 he became a life senator, and in the cabinet of M. Jules Ferry, constituted 1880, he was appointed minister of foreign affairs. The chief event of his tenure of this office was the occu-

BARTHET — BARTHOLOMEW BAYOU

pation of Tunis. In 1881 he again abandoned public life for study and literary work. His greatest work is his complete French version of Aristotle (1837-93); and among his other writings are 'De la Logique d'Aristote' (1838); 'Des Védas' (1854); 'Du Bouddhisme' (1855); 'Letters on Egypt' (1856); 'Le Bouddha et sa Religion' (1862); 'Mahomet et le Coran' (1865); 'De la Métaphysique' (1879); 'L'Inde Anglaise' (1887); 'La Philosophie dans les rapports avec les Sciences et la Religion' (1889); 'Etude sur Francis Bacon' (1890); 'Victor Cousin' (1895); and other works on Hindu religions, philosophy, etc.

Barthet, bar-tā, **Armand**, French poet and novelist: b. 1820; d. 1874. He is best remembered as the author of 'The Sparrow of Lesbia' (1849), a comedy in verse, written for the famous Rachel.

Barthez, bar-tās, **Paul Joseph**, distinguished French physician: b. Montpellier, 11 Dec. 1734; d. 15 Dec. 1806. He completed his medical studies and received the degree of M.D. in 1753, and in 1754 he came to Paris, where he was received into the society of Barthélemy, D'Alembert, and other eminent men. Recalled to Montpellier he founded there a medical school, which acquired a reputation throughout all Europe. He also published there his 'Nouveaux Eléments de la Science de l'Homme' (1778; 2nd augm. ed. 1806), which was translated into most of the European languages. He returned in 1780 to Paris, where he was appointed by the king consulting physician, and by the Duke of Orleans his first physician. The Revolution deprived him of the greater part of his fortune and his place. Napoleon, who understood how to discover merit, brought him forth again, and loaded him in his advanced age with dignities. His name will be remembered with the same respect as those of Boerhaave, Hoffmann, Sydenham, and Cullen. Among his numerous writings may be specially mentioned the 'Nouvelle Mécanique des Mouvements de l'Homme et des Animaux.'

Barthold, bar-tölt, **Friedrich Wilhelm**, German historian: b. Berlin, 1799; d. 1858. He became professor of history at Greifswald in 1831. His principal writings are 'Geschichte von Rugen und Pommern' (1839-45); 'Geschichte der Deutschen Städte und des Deutschen Bürgertums' (1850-2); 'Geschichte der Deutschen Hansa' (1854); 'Geschichte des grossen Deutschen Kriegs vom Tode Gustav Adolf's ab' (1841-3).

Bartholdi, bar-töl-de, **Frédéric Auguste**, distinguished French sculptor: b. Colmar, Alsace, 2 April 1834. He received the cross of the Legion of Honor in 1865. His principal works are the 'Lion of Belfort'; statue of Lafayette in Union Square, New York; bronze group of Lafayette and Washington, in Paris (1895); and the colossal figure in New York harbor, 'Liberty Enlightening the World.' See also LIBERTY, STATUE OF.

Bartholdy, bär-töl'de, **Jakob Salomon**, German diplomatist: b. Berlin, 13 May 1779; d. Rome, 27 July 1825. He was of Jewish parentage and was educated at Halle, and visited Paris, Greece, and Italy. On his return from his travels he became a Protestant Christian. He joined the Austrian army against the

French and took part in the campaigns until the occupation of Paris in 1814; was present at the Congress of Vienna and of Aix-la-Chapelle, and afterward lived at Rome, where he was a great patron of the fine arts. He called the art of fresco-painting into new activity by having his house decorated *al fresco* by Overbeck, Cornelius, Schadow, and Catel. His collections of bronzes, vases, and glasses were bought for the museum of Berlin.

Bartholin, bar'tō-len, **Kasper**, Danish physician: b. Malmö, Sweden, 12 Feb. 1585; d. Sorø, 13 July 1630. He traveled in Germany, France, England, and Italy, and taught medicine at Padua, Wittenberg, and Copenhagen. He was for many years rector of the university of Copenhagen, and his 'Institutiones Anatomical' was a text-book in general use in Europe in the 17th century in various translations.

Bartholin, Thomas, Danish physician, the most distinguished of the sons of the preceding: b. Copenhagen, 20 Oct. 1619, d. 4 Dec. 1680. After traveling throughout Europe, and making the acquaintance of the most learned men of his time, he became professor of anatomy in the University of Copenhagen. He made several discoveries in this science, and his merits were highly esteemed by the king, who appointed him the royal physician, and bestowed emoluments upon him after he had lost his valuable library by a fire. He revised his father's 'Anatomy' and was a firm believer in Harvey's theory of the circulation of the blood. His son, Kaspar (1654-1704) was a famous anatomist, and his son, Thomas (1650-90), was an antiquarian writer whose 'Antiquitatum Danicarum Libri Tres' (1689) is of much value.

Bartholin's Glands (named after their discoverer, Kaspar Bartholin) (qv), are the vulvo-vaginal glands, two in number, situated inside the vaginal opening. They secrete a mucous excretion and are subject to infection, forming abscesses. See also BARTHOLOINITIS; COWPERITIS.

Bartholomew, Edward Sheffield, American sculptor: b. Colchester, Conn., 1822; d. 2 May 1858. He studied in New York and in Rome, where he lived during the latter part of his life. Among his works are 'Blind Homer, Led by His Daughter,' 'Eve,' 'Youth and Old Age,' 'Ganymede,' and 'Evening Star.'

Bartholomew, Saint (son of Tolmai), the apostle, probably the same person as NATHANAEAL, mentioned in the Gospel of St. John as an upright Israelite, and one of the first disciples of Jesus. The derivation of his name and descent from the family of the Ptolemies is fabulous. He is said to have taught Christianity in the south of Arabia, into which, according to Eusebius, he carried the Gospel of St. Matthew in the Hebrew language. Chrysostom mentions that he preached in Armenia and Asia Minor, and tradition tells that he was flayed alive and crucified with his head downward. The ancient Church had an apocryphal gospel bearing his name, of which nothing has been preserved. His day is the 24th of August.

Bartholomew Bayou, a river of the United States which rises in Jefferson County, Arkansas, flows in a southerly direction and empties into the Ouachita River in Louisiana. It is navigable for over 200 miles.

BARTHOLOMEW FAIR — BARTHOLOMEW'S HOSPITAL

Bartholomew Fair, a celebrated fair formerly held in West Smithfield, London, on St. Bartholomew's Day, 24 August. It was first established in the reign of Henry I., and was originally devoted mainly to the purposes of business and traffic. Sports, exhibitions, and popular amusements were also introduced, among them being the mysteries and miracle plays of the Church. In process of time the transacting of serious business was gradually superseded, and the chief attraction of the fair consisted in shows and other amusements. Latterly even these declined in quality, and the institution came to be regarded as a nuisance, subversive of order and morals. After many discussions on the propriety of abolishing the fair, this was finally effected in 1855. See Morley, *'Memoirs of Bartholomew Fair'* (1859).

Bartholomew, Saint, one of the Leeward Islands, in the West Indies, 120 miles to the northwest of Guadeloupe, belonging to France (to which it was transferred by Sweden in 1877), about 8 square miles in area, and rising to the height of about 1,000 feet. It produces tobacco, sugar, cotton, indigo, cassava, drugs, etc., with some excellent woods (including *lignum vitæ*), and limestone. All the fresh water which can be procured is saved in cisterns, as there are no springs. The climate is healthy. The island is encompassed by formidable rocks, which render it dangerous of access to shipping. Pop 2,835. The only town is Gustavia or St. Bartholomew. In the South Pacific Ocean are two other islands of the same name.

Bartholomew, Massacre of Saint, the slaughter of French Protestants in Paris and other cities in France on various dates between 24 Aug. and 3 Oct. 1572. After the death of Francis II., Catherine de Medici had assumed the regency for her son, Charles IX., then only 10 years old, and in spite of the opposition of the Guises she issued an edict of toleration in favor of the Protestant party, 1562, which she had favored in many ways. The party of the Guises now persuaded the nation that the Roman Catholic religion was in the greatest danger. Religious dissension grew rife, and each party, Roman Catholic and Huguenot, under pretext of religion, treated the other with cruelty. Prince Condé took up arms; the Guises had recourse to the Spaniards, Condé to the English, for assistance. Both parties were guilty of the most atrocious cruelties, but finally concluded peace. The queen-mother caused the king, who had entered his 14th year, to be declared of age, that she might govern more absolutely under his name. Duke Francis de Guise had been assassinated by a Huguenot, at the siege of Orleans; but his spirit continued in his family, which considered the Admiral Coligny as the author of his murder. The king had been persuaded that the Huguenots had designs on his life, and had conceived an implacable hatred against them. Meanwhile the court endeavored to gain time, in order to seize the persons of the prince and the admiral by stratagem, but was disappointed, and hostilities were renewed in 1565, and still again after the Peace of Longjumeau, 1568, this time with greater cruelty than ever. In the battle of Jarnac, 1569, Condé was made prisoner and shot by Capt. de Montesquieu. Coligny collected the remains of the

routed army; the young Prince Henry de Béarn (afterward Henry IV., king of Navarre and France), the head of the Protestant party after the death of Condé, was appointed commander-in-chief, and Coligny commanded in the name of the Prince Henry de Condé, who swore to avenge the murder of his father. The advantageous offers of peace at St. Germain-en-Laye (8 Aug. 1570) satisfied the chiefs of the Huguenots, particularly Admiral Coligny, who was wearied with civil war. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother; he invited the old Coligny, the support of the Huguenots, to his court, and honored him as a father. The sister of the king was married to the Prince de Béarn (18 Aug. 1572); this union opened up a field for the most distinguished Huguenots in Paris. Meanwhile the queen had allied herself to the Guise family, and jealous of the influence of Coligny with the king, determined to have him assassinated. On 22 August a shot from a window wounded the admiral. The king hastened to visit him, and swore to punish the author of the villainy; but on the same day he was induced by his mother to believe that the admiral had designs on his life. "God's death!" he exclaimed: "kill the admiral; and not only him, but all the Huguenots: let none remain to disturb us!" The following night Catherine held the bloody council which fixed the execution for the night of St. Bartholomew, 24 Aug. 1572. After the assassination of Coligny a bell from the tower of the royal palace, at midnight, gave to the assembled companies of 2,000 burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the king of Navarre saved their lives by choosing mass rather than death, and pretending to embrace the Roman Catholic religion. Roman Catholics as well as Huguenots fell victims to the political and personal hatred of the slayers. By the king's orders the massacre was extended through the whole kingdom; and if, in some provinces, the officers had honor and humanity enough to disobey the orders to butcher their innocent fellow citizens, yet instruments were always found to continue the massacre. This horrible slaughter continued over 40 days; the victims are calculated from 10,000 to 100,000. The Calvinist martyrology cites 786 names; 2,000 is the number computed by late historians. At Rome the massacre was reported as a victory over a great Huguenot conspiracy against the king; it was for this reason the Pope ordered the *Te Deum* to be chanted and a medal struck commemorating the event. Those of the Huguenots who escaped fled into the mountains and to Rochelle. The Duke of Anjou laid siege to that city, but, during the siege, received the news that the Poles had elected him their king. He concluded a treaty, 6 July 1573, and the king granted to the Huguenots the exercise of their religion in certain towns. See also HUGUENOTS. See Loughnan, *'The Month'* (1892).

Bartholomew's Hospital, Saint, formerly the priory of St. Bartholomew, and made a hospital by Henry VIII. in 1547. It contains 676 beds, and, on an average, 6,000 patients are annually admitted to the hospital, while about 100,000 out-patients are relieved by it.

BARTHOLOMITES — BARTLETT

Barthol'omites. See BASILIANS.

Bar'tizan, a battlement on the top of a house or castle; a small overhanging turret projecting from the angle on the top of a tower, or from the parapet or other parts of a building; or, the battlement surrounding a spire or steeple, or the roof of a cathedral or church.

Bartlett, Elisha, American physician and author. b. Smithfield, R. I., 1805; d. there, 18 July 1855. He graduated from the medical department of Brown University in 1826, and delivered the course of lectures on pathological anatomy at the Berkshire medical institute in Pittsfield, Mass., in 1832. In 1836 or 1837 he was elected the first mayor of Lowell. He subsequently lectured at Dartmouth College, and in Transylvania University and the universities of Maryland and New York. In 1851 he became professor of materia medica and medical jurisprudence in the College of Physicians and Surgeons in New York, which place he held until his death. He published 'Essay on the Philosophy of Medical Science' (1844); 'Fever of the United States' (1850); and a volume of poems, entitled 'Simple Settings in Verse for Portraits and Pictures in Mr. Dickens' Gallery' (1855).

Bartlett, Edwin Julius, American chemist: b. Hudson, O., 16 Feb. 1851. He was graduated at Dartmouth College in 1872, and at Rush Medical College in 1879; made associate professor of chemistry in Dartmouth in 1879, and full professor in 1883. He is a member of the American Chemical Society, and the New York Medico-Legal Society, and an honorary member of the New Hampshire Medical Society. He is the author of many papers on chemical subjects.

Bartlett, Sir Ellis Ashmead. See ASHMEAD-BARTLETT.

Bartlett, Homer Newton, American composer: b. Olive, N. Y., 28 Dec. 1846. He began his public career when 9 years of age, and at 10 composed violin music, piano duos, songs, and vocal duets. He has written a large number of anthems, quartets, and glees for vocal rendering, and pieces for the flute, stringed instruments, and military bands and orchestras. His best compositions include a three-act opera, 'La Valliere': a cantata, 'The Last Chieftain'; an oratorio, 'Samuel,' etc.

Bartlett, Ichabod, American lawyer: b. Salisbury, N. H., 1786; d. 19 Oct. 1853. He graduated at Dartmouth College in 1808, commenced the practice of the law in Durham, but soon removed to Portsmouth, where his skill and ability soon commanded success. He is celebrated as an opponent of Webster and Mason. He was frequently a member of the State legislature, and was elected to the United States House of Representatives for three terms, 1823-9.

Bartlett, John, American author and publisher: b. Plymouth, Mass., 14 June 1820. He became a publisher in Cambridge in 1836, and senior partner in the Boston publishing house of Little, Brown & Company, in 1878. His works include: 'Familiar Quotations' (1854; 9th ed. 1891); 'New Method of Chess Notation' (1857); 'The Shakespeare Phrase-Book' (1882); 'Catalogue of Books on Angling. Including Ichthyology, Pisciculture, etc.' (1882);

'The Shakespeare Index'; 'The Complete Concordance to Shakespeare's Dramatic Works' (1894); and 'Poems.'

Bartlett, John R., American naval officer: b. New York, 1843. He was appointed an acting midshipman in the navy from Rhode Island in 1859; entered the United States Naval Academy, where he remained till the beginning of the Civil War, when he was assigned to the West Gulf Blockading Squadron. He took part in the bombardment and passage of Forts St. Philip and Jackson, and the Chalmette batteries, and the capture of New Orleans and attack on Vicksburg in June 1862. He was promoted lieutenant in 1864; took part in the bombardment of Fort Fisher in December, and the assault on its works in January. Subsequently he was on surveying duty in Nicaragua and on the United States Coast Survey; was promoted to captain, 1 July 1892; and was retired 12 July 1897. After the declaration of war against Spain, in 1898, he was recalled to active service, and on 9 July succeeded Rear-Admiral Erben as commander of the Auxiliary Naval Squadron, organized for the protection of the Atlantic coast cities.

Bartlett, John Russell, American author: b. Providence, R. I., 23 Oct. 1805; d. 28 May 1886. He was educated for a mercantile career, and after 1837 entered the book-importing trade in New York. In 1850, he was appointed one of the commissioners to determine the Mexican boundary. In 1855 he was made secretary of State of Rhode Island. He published various valuable records, genealogies, local histories, etc., but his best known work is his 'Dictionary of Americanisms' (1850).

Bartlett, John Sherren, Anglo-American journalist, founder of the *Albion* newspaper in New York. b. Dorsetshire, England, 1790; d. 24 Aug. 1863. He was educated as a physician in London; was appointed surgeon in the royal navy in 1812; sailed to the West Indies on board the packet *Swallow*; was captured by the American frigates *President* and *Congress*, under Commodore Rodgers, and remained a prisoner at Boston until discharged in 1813. At the close of the war he married a lady of Boston and established himself there as a physician. The *Albion*, commenced by him in New York, 22 June 1822, as an English organ of conservative politics, gained a wide and profitable circulation. Bartlett subsequently commenced one or two other papers of a similar character at a cheaper price, and on the beginning of Atlantic steam navigation also established at Liverpool the *European*, a weekly compendium of the latest news for American circulation. Owing to the failure of his health, he withdrew from the *Albion* in 1848. He subsequently published the *Anglo-Saxon*, a weekly paper at Boston, which he continued about two years. In 1857 he served as English consul at Baltimore.

Bartlett, Joseph, American wit, poet, and adventurer: b. Plymouth, Mass., 1763; d. Boston, 27 Oct. 1827. He began the study of law at Salem, but soon gave it up for a voyage to England. Here he pursued the career of an adventurer, gambled, spent, got into prison, wrote a play for his release, and went upon the stage himself. From an actor he became a merchant, and having sailed for America with

BARTLETT—BARTLEY

a large supply of goods on credit, was shipwrecked on Cape Cod. In 1799 he delivered a poem on 'Physiognomy' before the Phi Beta Kappa society of Harvard, satirical and clever, and said to touch upon the traits of individuals at the time. To the edition of this poem, published in 1823, were appended a number of 'Aphorisms on Men, Principles, and Things,' the results of his various experience. The same year he delivered a Fourth of July oration at Boston, and afterward recited a poem, entitled the 'New Vicar of Bray,' which obtained considerable celebrity. He next attempted the practice of law and of politics in Maine, was elected to the State legislature, and nearly secured an election to Congress by his active exertions as a speaker and newspaper writer. He then practised law at Portsmouth, N. H., and finally closed his improvident life, a burden to his friends, at Boston. See Duyckinck's 'Cyclopedia of American Literature.'

Bartlett, Josiah, American statesman: b. Amesbury, Mass., November 1729; d. 19 May 1795. He commenced the practice of medicine in 1750, at Kingston, and established a reputation, during the prevalence of the *angina maligna* in 1754, by treatment with Peruvian bark, in opposition to the usage of other physicians. He received several appointments from the royal governor, John Wentworth, but lost them in 1775, for being a zealous Whig. Being chosen delegate to the Continental Congress, he was the first who voted for, and the first, after the president, who signed the Declaration of Independence, his name being first called as representative of the most easterly province. He accompanied Stark in 1777 to Bennington. He was appointed chief justice of the common pleas in 1779, justice of the supreme court in 1784, and chief justice in 1788. He was an active member of the convention called to adopt the Federal constitution in 1788. In 1790 he was president of New Hampshire, and in 1793 was chosen the first governor under the new State constitution. He was also president of the medical society established in 1791, by his exertions. In all his various offices his duties were ably and faithfully discharged.

Bartlett, Paul Wayland, American sculptor: b. New Haven, Conn., 1865. He entered the École des Beaux Arts, Paris, 1880; became chevalier of the Legion of Honor, 1895. His principal works are: an equestrian statue of Gen. McClellan in Philadelphia; one of Lafayette in Paris (presented to France by the school children of the United States); a statue of Gen. Joseph Warren in Boston; statues of Columbus and Michel Angelo in the Library of Congress, and 'The Bear Tamer,' in the Metropolitan Museum of New York.

Bartlett, Samuel Colcord, American educator: b. Salisbury, N. H., 25 Nov. 1817; d. 16 Nov. 1898. He was educated at Dartmouth College, and became a teacher there and at Andover Theological Seminary. He had charge of a church at Monson, Mass.; subsequently becoming professor of philosophy in Western Reserve University, Ohio. He afterward became pastor of a church in Manchester, N. H., and later of the New England Church in Chicago. In 1858 he was made professor of biblical literature in the Chicago Theological Seminary, where he remained until 1873, when he spent

a year of travel in the East. In 1877 he accepted the presidency of Dartmouth College, which he held until 1892, when he resigned. He was the author of a number of works, including: 'From Egypt to Palestine' (1879); 'Sketches of Missions of the American Board'; 'Sources of History in the Pentateuch'; and 'The Veracity of the Hexateuch'; and also wrote a part of the American edition of 'Smith's Dictionary of the Bible.'

Bartlett, William Francis, American military officer: b. Haverhill, Mass., 6 Jan. 1840; d. 17 Dec. 1876. He was a student at Harvard University at the outbreak of the Civil War, but left to enter the army. He was wounded in the battle of Ball's Bluff, suffering the loss of a leg; but continued in the service; was twice wounded at Port Hudson; and in the battles of the Wilderness, while leading the 57th Massachusetts regiment, was again wounded, taken prisoner, and sent to Libby Prison. At the close of the war, he was made a major-general of volunteers for distinguished services in the field.

Bartlett, William Henry, English artist: b. Kentish Town, London, 29 March 1809; d. 25 Sept. 1854. He served an apprenticeship with the distinguished architectural antiquary, John Britton, who employed him to make drawings for his 'Cathedral Antiquities' and 'Picturesque Antiquities of English Cities.' Bartlett subsequently traveled extensively abroad, and the works which he published, descriptive of the countries visited by him, obtained great success with the public. They include 'Walks About Jerusalem' (1844); 'Forty Days in the Desert' (1848); 'The Nile Boat or Glances of Egypt' (1849); 'Footsteps of Our Lord and His Apostles in Syria, Greece, and Italy' (1851); 'The Pilgrim Fathers' (1853); 'Jerusalem Revisited' (1855).

Bartlett, William Holmes Chambers, American soldier and scientist: b. Lancaster County, Pennsylvania, 1809; d. 11 Feb. 1893. He was educated at West Point, and as lieutenant of engineers, was assistant professor there, 1827-9. He was engaged on the construction of Fort Munroe and Fort Adams; was assistant engineer at Washington, 1832-4; and again at West Point as assistant professor, 1834-6. When he resigned his lieutenantancy in 1836, he was made full professor of philosophy at West Point, and held this position until he retired in 1871. He was a member of the Natural Academy of Sciences and other scientific societies, and wrote several scientific books, including 'Treatise on Optics' (1839); 'Synthetical Mechanics' (1850-8); 'Acoustics and Optics' (1852-9); 'Analytical Mechanics' (1853-9); and 'Spherical Astronomy' (1858-9).

Bartley, Elias Hudson, American chemist: b. Bartleyville, N. J., 6 Dec. 1849. He was graduated at Cornell University in 1873; was an instructor there in 1874-5; professor of chemistry at Swarthmore College, 1875-8; lecturer at the Franklin Institute, Philadelphia, in 1877-8. He removed to Brooklyn in 1879; graduated at Long Island College Hospital in 1879; was lecturer there on physiological and practical chemistry in 1880-5; and then became professor of chemistry and toxicology. He was made chief chemist of the health department of Brooklyn, in 1882. He is the author

BARTOK — BARTOLOZZI

of several articles in Wood's 'Household Practice of Medicine' (1885), and of 'A Text-Book of Medical Chemistry.'

Bar'tok, Ludwig von, a Hungarian poet and dramatist: b. 1851. 'Carpathian Songs' includes his happiest verse. As a playwright, he is even more distinguished; the comedy of 'The Most Beautiful' (1880), and the historical tragedy, 'Margareta Kendi,' as well as 'Anna Thuran,' a historical drama, having been frequently acted.

Bartol, Cyrus Augustus, American Unitarian clergyman: b. Freeport, Me., 30 April 1813; d. 17 Dec. 1900. He was graduated at Bowdoin College in 1832, and at Cambridge Divinity School in 1835; became colleague pastor with Dr. Charles Lowell of the West Church (Unitarian,) in Boston, 1837, and full pastor in 1861. He was a member of the Transcendental Club. His works include: 'Discourses on the Christian Spirit and Life' (1850); 'Discourses on Christian Body and Form' (1854); 'Pictures of Europe Framed in Ideas' (1855); 'History of the West Church and Its Ministers' (1858); 'Church and Congregation' (1858); 'Word of the Spirit to the Church' (1859); 'Radical Problems' (1872); 'The Rising Faith' (1874); 'Principles and Portraits' (1880).

Bartoli, bar'tō-lē, Adolfo, Italian historian: b. Fivizzano, 19 Nov 1833; d. 1894. He has long been a recognized arbiter of taste and the elegancies in connection with his country's literature; his 'First Two Centuries of Italian Literature' (1870-80), and 'History of Italian Literature' (1878-89) being masterpieces. In 1874 he became professor of Italian literature in the Institute of Florence.

Bartoli, Daniello, a learned Italian Jesuit: b. Ferrara, 12 Feb. 1608; d. Rome, 13 Jan. 1685. He was the author of a celebrated history of the order of the Jesuits, published at Rome in six volumes (1653-75). Bartoli had access to many curious manuscripts in the Vatican, of which he availed himself. This gives to his work peculiar interest, and portions of it, as for instance that on Asia, passed through several editions. The first edition of 1667 contains also an interesting account of the mission to Mongolia, and a sketch of the life of Father Acquaviva. He also wrote on physics and philology. A new edition of his complete works in 12 volumes appeared at Turin in 1825, and a select edition of the most striking passages at Milan in 1826.

Bartoli, Pietro Santi, sometimes called PERUGIO, Italian painter and engraver: b. about 1635; d. Rome, 1700. He was a pupil of Nicolas Poussin. His engravings, numbering over 1,000, are scarce and valuable. His skill as a copyist was so great that he could counterfeit the effects of time on the colors of pictures. The 'Admiranda Romanorum Antiquitatem Vestigia,' a collection of engravings much esteemed archæologically, is his most important work.

Bartolini, bār-tō-lē'ne, Lorenzo, celebrated Italian sculptor: b. Vernio, 1777; d. Florence, 1850. In his youth he was a pupil of Desmarests, a French painter, and made considerable progress; but the bent of his genius leading him rather to handle the chisel than

the brush, he proceeded to Paris and entered the studio of the sculptor Lemot. Napoleon intrusted him with a multitude of works, among others a colossal bust of the emperor placed above the entrance of the French Institute, and a magnificent statue of him, which, in consequence of the events of the restoration, was never delivered to government, and is now in America. On the fall of the empire he returned to Florence, where he continued to exercise his profession. Among his greater works may be mentioned his groups of Charity, and Hercules and Lycas, and the beautiful monument in the cathedral of Lausanne, Switzerland, erected in memory of Lady Stratford Canning, who died there in 1817. Bartolini ranks next to Canova among modern Italian sculptors. See Canova, 'Schools and Masters of Sculpture' (1898).

Bartolommeo, bar-tō-lōm-mā'ō, Fra, or Baccio Della Porta, one of the most distinguished of the Florentine painters: b. Savignano, 1469; d. Florence, 1517. He learned in Florence the first principles of painting from Cosimo Roselli, and acquired a more perfect knowledge of art by studying the works of Leonardo da Vinci. He was an admirer and follower of Savonarola, on whose death, in consequence of a vow made during the peril of persecution, he took the Dominican habit in 1500, and assumed the name of Fra Bartolommeo. For the space of four years he did not touch his pencil, and employed it afterward only on devotional subjects. Raphael visited Florence in 1504 and gave instructions to Bartolommeo in perspective, receiving in return his lessons in coloring. Some years afterward the latter visited Michael Angelo and Raphael at Rome. After his return to Florence he executed several religious pictures, among which were a Saint Mark and Saint Sebastian, which are greatly admired. His style is severe and elevated, but very graceful in youthful figures; his coloring, in vigor and brilliancy, comes near to that of Titian and Giorgione. But he particularly excels in drapery, which none before him represented with equal truth, fulness, and ease. His pictures are preserved in the gallery of the Grand-Duke at Florence and in the palace of Pitti. See Jameson, 'Memoirs of the Early Italian Painters' (1887); Symonds, 'The Renaissance in Italy' (1885); Radcliffe, 'Schools and Masters of Painting' (1898); Cartwright, 'The Painters of Florence' (1901).

Bartolozzi, bār-tō-lōt'se, Francesco, a distinguished Italian engraver: b. Florence, 21 Sept. 1728; d. Lisbon, Portugal, April 1813. In Venice, in Florence, and Milan, he etched several pieces on sacred subjects, and then went to London, where he received great encouragement and accommodated himself entirely to the national taste, so as even to work in the popular red dotted manner. His pieces were so universally sought for that a complete collection of them was valued at £1,000. He was elected a member of the Royal Academy of Arts in London. After 40 years' residence in London he went to Lisbon to engrave on copper the portrait of the regent, where he received, in 1807, the order of Christ. With accuracy of design he united great delicacy of execution. Among his best engravings is the 'Death of Lord Chatham,' after Copley, and the 'Virgin and Child.' His works, among which are imitations

BARTOLUS—BARTON

in etching of drawings of the great masters, amount to more than 2,000. See Clement, 'Painters, Sculptors, and Engravers' (1899).

Bartolus, Osso, or Bartolus A. Saxoffer-rato, a celebrated Italian jurist: b. Sasso Ferrato, in the Marches of Ancona, about 1313; d. Perugia, 1356. He took his degree of doctor of law at Bologna, became professor, first at Pisa, and then at Perugia, was ennobled and honored with other distinction and privileges by the emperor Charles IV., and not only published many important works such as treatises 'On Procedure,' 'On Evidence,' and commentary on the 'Code of Justinian,' but distinguished himself in various other branches of knowledge.

Barton, Andrew, Scottish naval commander, who flourished during the reign of James IV., and belonged to a family which for two generations had produced able and successful seamen. In 1497 he commanded the escort which accompanied Perkin Warbeck from Scotland. After doing considerable damage to English shipping, he was killed in an engagement with two ships which had been especially fitted out against him (1512).

Barton, Benjamin Smith, American naturalist: b. Lancaster, Pa., 10 Feb. 1766; d. Philadelphia, 19 Dec. 1815. He studied the natural sciences and medicine in Philadelphia, Edinburgh, and London, and took his degree at Göttingen. He practised medicine in Philadelphia, and held successively the chairs of botany and natural history, materia medica, and theory and practice of medicine in the university there. He became president of many learned societies, was a correspondent of Humboldt, and, among other works, wrote 'Elements of Botany' (1812-14); 'Collections for an Essay toward a Materia Medica of the United States' (3d ed. 1810); and 'Flora Virginica' (1812).

Barton, Bernard, English poet, often styled the Quaker poet: b. London, 31 Jan. 1784; d. 19 Feb. 1814. In 1806 he removed to Woodbridge, in Suffolk, where he entered into a business in coals and corn; but subsequently gave up this occupation, and in 1810 became clerk in a bank at Woodbridge, a situation which he held till not long before his death. In 1824 a reading society founded by him at Woodbridge presented him with £1,200, and he afterward received a pension of £100 through Sir Robert Peel. His first appearance as an author was in 1812, when he published a small volume of poems under the title of 'Metrical Effusions,' which led to a correspondence with the poet Southey. This was followed in 1818 by 'Poems by an Amateur,' and in 1820 by a volume entitled simply 'Poems,' which became popular, and gained him the friendship of Lamb and Byron. Of his other productions the chief were: 'Napoleon, and other Poems' (1822); 'Poetic Vigils' (1824); 'Devotional Verses' (1826); 'A New-Year's Eve, and other Poems' (1828); besides many contributions to the annuals and magazines. His last work was 'Household Verses' (1845). His daughter, Lucy, published 'Selections from the Poems and Letters of Bernard Barton,' in 1849. His poetry, though deficient in force, is pleasing, fluent, and graceful, animated by a love of nature, and by a pure religious spirit.

Barton, Clara, American philanthropist: b. Oxford, Mass., 1830. She early became a teacher, and founded at Bordentown, N. J., a free school, opening it with six pupils. In 1854 it had grown to 600, when she became a clerk in the patent office in Washington. On the outbreak of the Civil War she resigned her clerkship and became a volunteer nurse in the army hospitals and on the battle-field. In 1864 she was appointed to the charge of the hospitals at the front of the army of the James. She was present at several battles, and in 1865 was placed by President Lincoln in charge of the search for missing men of the Union armies, having already devoted much time to that work at her own expense. On the breaking out of the Franco-Prussian war in 1870, she aided the Grand Duchess of Baden in preparing military hospitals, assisted the Red Cross Society, and, at the request of the authorities, superintended the distribution of work to the poor of Strasburg in 1871, after the siege, and in 1872 did a like work in Paris. At the close of the war she was decorated with the Golden Cross of Baden and the Iron Cross of Germany. On the organization of the American Red Cross Society in 1881 she was made its president, and in that capacity in 1884 had charge of the measures to relieve sufferers from the Mississippi and Ohio floods. In 1883 she was appointed superintendent of the Reformatory Prison for Women at Sherborn, Mass. In 1889 she had charge of movements in behalf of sufferers from the floods at Johnstown, Pa.; in 1892 distributed relief to the Russian famine sufferers; in 1896 personally directed relief measures at the scenes of the Armenian massacres; in 1898, at the request of President McKinley, took relief to the Cuban reconcentrados, and performed field work during the war with Spain; and in 1900 undertook to direct the relief of sufferers at Galveston, but broke down physically. She resigned from the Red Cross Society in 1904. She has published 'History of the Red Cross' (1883); 'History of the Red Cross in Peace and War' (1898).

Barton, David, American legislator: b. probably in Waco County, Ky., 1785; d. Booneville, Mo., 27 Sept. 1837. He was one of the earliest settlers in Missouri; presided over the convention that drew up the State constitution in 1820; and was a United States Senator from that State in 1821-31.

Barton, Elizabeth, English religious impostor (commonly called the Holy Maid of Kent): b. about 1506; d. 20 April 1534. She was used as an instrument by the adherents of Queen Catherine to excite the English nation against the proposed divorce of Henry VIII. from his first wife, and the apprehended separation of the English Church from Rome, with which the king then threatened the Pope. Her delirious utterances, in a nervous illness, were made use of by the parson of Aldington, Richard Maister, and by a canon of Canterbury named Bocking, to persuade her that she was a prophetess inspired by God. Among other things she prophesied that Henry, if he persisted in his purpose of divorce and second marriage, would die a shameful death and be succeeded by Catherine's daughter. Her revelations, published and distributed by the monk

BARTON — BARUCH

Dering, produced such a fermentation among the people that Henry ordered the apprehension and examination of Elizabeth and her accomplices before the star-chamber. After they had there confessed the imposture they were condemned to make a public confession and to imprisonment; and the Maid, Bocking, Maister, Dering, and three others were afterward adjudged guilty of high treason for a conspiracy against the king, and executed. The venerable Bishop Fisher and Sir Thomas More were among those accused of holding correspondence with the Holy Maid; and the former was pronounced guilty of misprision, or concealment, of treason in consequence.

Barton, George Hunt, American geologist: b. Sudbury, Mass., 8 July 1852. He was assistant on Hawaiian Government survey, 1881-3; assistant in geology in the Massachusetts Institute of Technology in 1883-4; then assistant professor of geology there, he also occupied the corresponding chair in Boston University and the Teachers' School of Science; and was assistant geologist of the United States Geological Survey. In 1896 he was a member of the sixth Peary expedition to Greenland. He is a member of the Boston Society of Natural History, the National Geological Society, and the Geological Society of America, and the author of many technical papers.

Barton, William, American military officer: b. Warren, R. I., 26 May 1748, d. Providence, R. I., 22 Oct. 1831. He joined the Revolutionary army soon after Bunker Hill, and on the night of 10 July 1777, he performed the exploit which made him famous. Leading a small party of men, in four whale-boats, across Narragansett Bay, he surprised and captured the British general, Prescott, at his headquarters, and hurried him away to Washington's camp in New Jersey. Barton received a sword from Congress, and was brevetted colonel. He was afterward a member of the State convention which adopted the Federal Constitution.

Barton, William Paul Crillon, American botanist: b. Philadelphia, Pa., 17 Nov. 1786; d. 29 Feb. 1856, a nephew of Benjamin Smith Barton (qv). He was educated at Princeton College, and in the medical school of the University of Pennsylvania; was surgeon in the United States navy and became professor of botany in Jefferson Medical College, in 1815. He was author of 'Flora of North America' (1818-24); 'Vegetable Materia Medica of the United States' (1817-25); 'Compendium Floræ' (1818).

Bartram, John, an eminent American botanist: b. Chester County, Pa., 23 March 1699; d. 22 Sept. 1777. He is frequently called the "father of American botany," and he founded at Kingessing the first botanical garden in America. Linnæus termed him "the greatest natural botanist in the world." He published 'Observations of the Inhabitants, Climate, Soil, Diverse Productions, Animals, etc., Made in His Travels from Pennsylvania to Lake Ontario,' and a similar volume on eastern Florida (1766). He was in constant correspondence with European botanists, to whom he sent large collections of American plants and would readily undertake a journey of a hundred miles to see a new plant.

Bartram, William, American botanist and ornithologist: b. Kingessing, Pa., 9 Feb. 1739; d. there 22 July 1823; a son of John Bartram. He spent five years in the southern States studying natural history, and published the results in 'Travels Through North and South Carolina and East and West Florida.' He compiled a list of American birds, which was the best of its kind up to the time of Wilson.

Bartsch, bartsch, Adam von, Austrian engraver and art writer: b. Vienna, 17 Aug. 1757; d. there, 21 Aug. 1821. At the age of 16 he brought himself into the notice of the Austrian government by a series of engravings of the gold and silver medals issued during the reign of Maria Theresa, and, in 1781, was appointed keeper of the prints of the royal collection. In 1803 he produced the first volume of his well-known and authoritative work, 'Le Peintre-Graveur,' in 21 volumes, giving a description of the principal engravers of Europe, and criticisms on their works. He etched upward of 500 pieces, and published several catalogues of works of art.

Bartsch, Karl Friedrich Adolf Konrad, German philologist: b. Sprottan, Silesia, 25 Feb. 1832; d. 19 Feb. 1888. He was professor at Rostock, where he established the earliest Germanic seminary in Germany, 1858-71; and for the remainder of his life was head of the department of German and Romance philology at the University of Heidelberg. He was an extremely brilliant, versatile, industrious scholar whose attention was chiefly given to Middle High German and Provençal poetry, and was an original poet also, publishing a volume of lyrics in 1874. Beside an important study of the 'Nibelungenlied' (1865), he published 'The Song of Roland' (1874); a translation of Burns ((1865); and of Dante's 'Divina Commedia' (1867), as well as introductions to the study of Provençal and old French, etc.

Barttelot, bar-tlō', Edmund Musgrove, English soldier: b. 1859; d. 1888. Entering the Indian army he served in the Afghan campaign, and as major in the Egyptian army, joined the Stanley expedition for the relief of Emin Pasha in 1887. In June 1888 he began a journey into the heart of Africa and in the course of a mutiny among his followers was shot by one of his men. He was accused of barbarous cruelty in his command by Stanley, a charge oposed by Barttelot's brother in his 'Life of Edmund Musgrove Barttelot' (1890).

Baru, ba-roo', Philippines, a town of Leyte, 31 miles from the capital of the province, Tacloban. Pop. 12,322.

Baru (Maylay), a wooly material found at the base of the leaves of a sago palm-tree, *saguerus saccharifer*. It is much used in stuffing cushions and calking ships.

Baruch, bā'rūk (Hebrew, "the blessed"), the name of several individuals, of whom the most celebrated was the son of Neriah, scribe and assistant to the prophet Jeremiah. During the reign of Jehoiakim, about 607 B.C., Jeremiah while in prison, having been divinely commissioned to put all his prophecies in writing, dictated them to Baruch, who inserted them in a roll, which he was ordered to read both within and at the entrance of the temple. Jehoiakim on hearing its commencement cut it in pieces

BARUS — BAS-RELIEF

and threw it into the fire. At the captivity, after the destruction of Jerusalem, Jeremiah and Baruch were permitted to remain in Palestine, but were afterward carried into Egypt, 588 B.C. The subsequent life of Baruch is little known. One of the apocryphal books bears the name of Baruch. The Council of Trent gave it a place in the canon, but its authenticity was not admitted either by the ancient Jews or the early Christian fathers.

Barus, Carl Hazard, American physicist: b. Cincinnati, O., 19 Feb. 1856. He studied at Columbia College and the University of Wurzburg; was physicist of the United States Geological Survey in 1880-92; professor of meteorology in the United States Weather Bureau, 1892-3; and physicist of the Smithsonian Institution, in 1893-5. In 1895, he became professor of physics at Brown University. He is a member of the National Academy of Sciences; was vice-president and chairman of the section of physics in the American Association for the Advancement of Science in 1897; and is a corresponding member of the British Association for the Advancement of Science. He contributes to the American Journal of Science, and has written also valuable monographs for the United States Geological Survey.

Bary, ba're, Heinrich Anton de, German physician and botanist: b. Frankfort-on-the-Main, 26 Jan. 1831; d. 19 Jan. 1888. He is noted for his investigations in cryptogamic botany, and was professor of botany at Freiburg in 1855, at Halle in 1867, and at Strasburg in 1872. Among his works are 'Die Mycetozen' (1859); 'Vergleichende Morphologie und Biologie der Pilze, Mycetozen und Bacterien' (1884); 'Vorlesungen uber Bacterien' (1885).

Barye, ba-re, Antoine Louis, noted French sculptor: b. Paris, 24 Sept. 1795; d. there, 25 June 1875. He studied engraving with Fourrier and a goldsmith named Beinnais; in 1812, was a topographical engineer, and is supposed to have modeled a number of relief maps now in the French war office. In 1816 he studied drawing with the painter Gros, and sculpture with Basio; and, in 1819, took the second prize for a 'Milo di Crotona,' which was awarded him at a Concours of the Beaux Arts. From 1823 till 1831 he worked under Fauconnier, jeweler to the Duchesse d'Angoulême. In 1831 he exhibited the celebrated 'Tiger Devouring a Crocodile,' and was then employed by M. Lefuel to make four groups for the pavilion on the Place du Carrousel. He was an officer of the Legion of Honor, a member of the Institute, and a professor at the Jardin des Plantes. See Brownell, 'French Art' (1892).

Bary'ta, barium monoxid. See **BARIUM**.

Barytes, a common name for **BARITÉ** (q.v.).

Baryton (viola di Bardone), a chamber instrument, very popular in the 18th century, but now obsolete. It was somewhat like the viol di gamba in tone, but had a broader finger-board, with six or seven gut-strings, while under the neck there were from 9 to 24 strings of brass wire, which were pinched with the point of the thumb, to produce a sound, while the gut-strings were acted on by a bow.

Barytone. See **BARITONE**.

Bas, or Batz, a French island in the department of Finisterre, 2½ miles from the coast

in the English Channel. Although but three miles long and two miles wide it is defended by two forts and four batteries. It has a lighthouse at an elevation of 212 feet, and three fishing villages. Pop. (1896) 1,286.

Bas-relief, ba-re-lēf' (in Italian, *basso-rilievo*, or low relief), as applied to sculpture, a representation of one or more figures, raised on a flat surface or background, in such a manner, however, as that no part of them shall be entirely detached from it. *Alto-rilievo*, or high relief, is that in which the figures project half of their apparent circumference from the background. *Mezzo-rilievo*, or middle relief, is a third species, between the two. But, generally speaking, the first term is made to comprehend both the others. The term itself was invented in Italy, about the 11th or 12th century, on the revival of the arts; for the Greeks called such works simply carved (*anaglypta*); and to what is now called high relief they only applied the term rounded (*torcutikē*).

Bas-relief is particularly allied to architecture and under its dominion, since any considerable work of this kind must be made for the pediment, frieze, or panel of a building, or for some other architectural work, such as a tomb, sarcophagus, pedestal, or column. Bas-reliefs seem to have been invented in the earliest ages by the Egyptians, for the whole of their ancient monuments are covered with them, being executed in the same way as the hieroglyphics on their sepulchral chambers, obelisks, and temples. This has been finely illustrated by the drawings and models of the tomb of Sethi I., originally discovered near the ancient Thebes by Belzoni, and which has since become familiar to many persons; all the walls of that extraordinary excavation being covered with thousands of figures in low relief, colored, and exhibiting the religious and warlike ceremonies of that wonderful people. Bas-reliefs, too, are found in India, decorating the subterranean temples of Ellora and Elephanta in an astonishing profusion. The subjects are, of course, sacred, and in the style of drawing resemble very strongly those of the Egyptian monuments, but are evidently inferior, having larger heads and disproportioned bodies and limbs. Both these temples have been well illustrated and described by Thomas Daniell, R.A., and Capt. Scaley; and for further information their respective works may be consulted. The Persians, too, like other ancient nations, employed bas-relief as a figured writing, thereby recording and representing the symbols of the power and energy of the Divinity, their own religious ceremonies, and warlike achievements. The sculptures still existing on the ruins of the palace of Persepolis and the royal tombs accord in many striking particulars with those taken to England by Belzoni. In both the figures are arranged in lines, either horizontal or perpendicular, to suit the double purpose of decoration and description. In both of them the natives of Egypt are distinguished by the hood with lappets, the mitre, the full hair artificially curled, the close tunic, the apron of papyrus; the Hindus, by the necklaces, bracelets, and anklets; the Hebrews, by their long beards, and hair in spiral ringlets, their caps, full tunics, with regular folds and large sleeves; the Medes, again, by their close tunics; while the Persians themselves, in many particulars, resemble the

Hebrews. The comparison may be easily made by looking over the prints in Sir Robert Ker Porter's 'Travels in Persia,' and those in Le Bruyn's 'Travels,' and then the engravings of Denon's and Belzoni's large works.

Since it has been well observed that the Greeks commenced in works of art precisely where the Egyptians left off, we find that the early bas-reliefs of Greece resemble pretty accurately those of Egypt. The objects are represented in the same hard and simple manner, and the marbles taken to England from the temple of Ægina serve to fill up the history of sculpture, in the interval between its first introduction into Greece and its full development under Phidias, at Athens, when that glorious work, the Parthenon, was produced under the auspices of Pericles.

The draperies in these early bas-reliefs are thin and meagre, showing the forms of the body and limbs; the folds regular, small, and distinct, consisting chiefly of perpendicular and zigzag lines. Some of the head-dresses consist of small curls, very like the fashions of barbarous nations; and in a bronze patera in the British Museum the club of Hercules is ornamented with spiral flutes, like one brought by Capt. Cook from the Sandwich Islands.

The best examples of bas-relief now in existence are to be found within the walls of the British Museum. We mean, of course, those of the Elgin Marbles, which are executed in this manner. And in the same collection are the tombstone of Xanthippus, and a man curbing a horse, both conjectured to be of the age of Phidias, and which formed part of the Townley collection. In the collection of the Marquis of Lansdowne is a Greek bas-relief of Calchas, the size of life. At Wilton there is a beautiful representation of the 'Death of Meleager,' and a small but curious 'Hercules and Æglé'; a bas-relief composed of mosaic in natural colors, which is supposed to be unique. The celebrated Barberini vase, formerly in the possession of the Duke of Portland, is of dark-blue glass, bearing figures in bas-relief of white enamel or glass of admirable workmanship. Fragments of bas-reliefs of similar materials have been found in the ruins of Cæsar's palace at Rome, where they had been fixed in the walls. The two triumphal columns of Trajan and Antonine are covered with bas-reliefs, containing several thousand figures (the first, indeed, has 2,500 human figures, according to Vasi), without reckoning horses, elephants, mules, and the implements of war.

Basaiti, bā-sā-ē'tē, **Marco**, celebrated painter of Greek extraction: b. Friuli about the middle of the 15th century. He settled in Venice, where several of his paintings, remarkable for the brilliancy of their coloring, and distinguished by other excellences, are seen. His masterpiece, now in the Venetian Academy, is 'The Calling of St. Andrew and St. Peter.' He was the contemporary, and not unfrequently the successful rival, of Gian Bellini.

Basalt', a class of rocks belonging to the volcanic series and characterized by augite and plagioclase feldspar as essential constituents, and by iron ores (magnetite and ilmenite) as accessory minerals. Olivine is also present in typical basalts; among the rarer minerals are orthorhombic pyroxene, black mica, hornblende,

quartz, leucite, and nepheline. Those varieties which contain notable quantities of olivine are known as olivine basalts, while the presence of leucite and nepheline characterizes the leucite basalts and the nepheline basalts. In texture the basalts vary from a finely crystalline apparently homogeneous mass to coarsely crystalline aggregates; but the normal type is a fine-grained, black rock, in which olivine is the only mineral that can be recognized without the microscope. The ground mass of the denser varieties contains more or less glass, due to the rapid cooling of the magma from the molten state. Basalts are extremely abundant especially in those regions which have undergone volcanic disturbance within geologically recent times; in fact most of the volcanoes of the present day erupt basaltic materials. In the United States they occur mostly in the region west of the Mississippi River, where great areas have been flooded by fissure eruptions. The tendency of basalt to assume a columnar structure often lends a characteristic appearance to scenery, as is illustrated by the famous Giants' Causeway on the north coast of Ireland.

Basanite, baz'a-nīt (Gr. *basanos*, "touch-stone"). See TOUCHSTONE.

Bascinet, or **Basnet**, a light helmet, sometimes with but more frequently without a visor, and worn by knights at times when, though apprehension of danger was not imminent, it might not have been safe to be altogether unarmed. It resembled a basin, and hence its name. It was in general use for English infantry in the reigns of Edward II. and III., and Richard II., and is frequently mentioned in Parliamentary and other public records.

Bas'com, **Florence**, American educator, daughter of Dr. John Bascom (q.v.). She was educated at the University of Wisconsin and at Johns Hopkins University, receiving from the first the degree of B.A. and B.L. in 1882, B.S. in 1884, and M.A. in 1887; and from the latter that of Ph.D. in 1892. She was the first woman to whom Johns Hopkins granted a degree, and the first to receive a Ph.D. from any American college. She had much difficulty in securing admission to Johns Hopkins as a graduate student, the only concession to her sex being that she might attend the lectures on geology, and use the laboratory apparatus in that branch. She had previously applied herself to geology, and her thesis on receiving her Ph.D. was on inorganic geology, palæontology and chemistry being minor subjects. Subsequently she was engaged in teaching; was assistant editor of the 'American Geologist'; became professor at Bryn Mawr College; and in 1899 was chosen to supervise the geological survey of Chester County, Pa.

Bascom, **Henry Bidleman**, American clergyman: b. Hancock, N. Y., 27 May 1796; d. 8 Sept. 1850. He was licensed to preach in 1813, and made chaplain to Congress in 1823; president of Madison College, Pennsylvania (1827-9), and of the Transylvania University, Ky., 1842. In 1850 he was made a bishop of the Methodist Episcopal Church. He edited the 'Quarterly Review,' 1846-50. His writings were published in 1856.

Bascom, **John**, American educator and philosophical writer: b. Geneva, N. Y., 1827. He was president of the University of Wisconsin.

BASE — BASEBALL

sin, 1874-87, and in 1900 was professor of political science in Williams College. He has written a number of philosophical works, among them 'Philosophy of English Literature' (1874); lectures before the Lowell Institute; 'Comparative Psychology' (1878); 'Sociology' (1887); 'An Historical Interpretation of Philosophy' (1893); 'Growth of Nationality in the United States' (1899); and 'God and His Goodness' (1901).

Base. In *architecture*: (a) The part of a column between the bottom of the shaft and the top of the pedestal. In cases in which there is no pedestal, then the base is the part between the bottom of the column and the plinth. (b) A plinth with its moldings constituting the lower part (that which slightly projects) of the wall of a room.

In *botany*, a term applied to the part of a leaf adjoining the leaf-stalk, to that portion of a pericarp which adjoins the penduncle, or to anything similarly situated.

In *chemistry*, a body capable of replacing the hydrogen of an acid so as to produce a new compound, called a "salt," which contains the base and all the elements of the acid except the displaced hydrogen. The name was given by Rouelle in 1744, and is now loosely used to signify a metal, a salt-forming oxid or hydroxid, or an organic body, such as an alkaloid, an amide, an amine, pyridine, quinoline, etc., which is capable of combining with an acid to form a salt. When oxids combine with acids their oxygen unites with the liberated hydrogen of the acid, to form water. A body (like caustic potash, KOH), is said to be strongly basic when it forms salts that are very stable and are not altered by hot or cold water.

In *fortification*, the exterior side of a polygon, or the imaginary line connecting the salient angles of two adjacent bastions.

In *geometry*: (a) The base of an ordinary triangle is its third side, not necessarily the one drawn at the bottom of the diagram, but the one which has not yet been mentioned, while the two others have (Euclid, book i., prop. 4, Enunciation). (b) The base of an isosceles triangle is the side which is not one of the equal two (*Ibid.* prop. 5, Enunciation). (c) The base of a parallelogram is the straight line on which in any particular proposition the parallelogram is assumed to stand (*Ibid.* prop. 35). It also is not necessarily drawn the lowest in the figure (*Ibid.* prop. 47). (d) The base of a cone is the circle described by that side containing the right angle which revolves (Euclid, book xi, def. 20). (e) The bases of a cylinder are the circles described by the two rotary opposite sides of the parallelogram, by the revolution of which it is formed (*Ibid.* def. 23).

In *heraldry*, the lower part of a shield, or, more specifically, the width of a bar parted off from the lower part of a shield by a horizontal line. It is called also base-bar, baste, and plain point ('Glossary of Heraldry').

In *military affairs*, see TACTICS.

In *ordnance*, the protuberant rear portion of a gun between the knot of the cascabel and the base-ring.

In *sculpture*, the pedestal of a statue.

In *trigonometry, surveying, and mapmaking*, a base or base-line is a straight line measured on the ground, from the two extremities of which angles will be taken with the view of laying

down a triangle or series of triangles, and so mapping out the country to be surveyed.

In *zoology*, that portion of anything by which it is attached to anything else of higher value or signification (Dana).

Base of Operations. See TACTICS.

Baseball, a popular sport in the United States, of such general interest as to be known as "the national game." It had its origin in the old English game of "rounders," but developed on American soil into a very different sport. In Philadelphia an early form was played under the name of "town-ball," and a similar game was known in Upper Canada as early as 1838. It was in the neighborhood of New York, however, that baseball received its greatest development, regularly organized clubs contesting in the "Elysian Fields," at what is now the site of the city of Hoboken, N. J., as early as 1845. It was not until 1857, however, that the first baseball convention was held for the purpose of framing uniform rules out of the various methods of each district and club, and in the following May the first "National Baseball Association" was organized.

The first real series of games played between organized clubs was that between teams picked from the various clubs of New York and Brooklyn on the old Fashion Racecourse at Flushing L. I., in 1858, the first authorized code of rules being formulated and published for their direction. From the present view-point these rules were crude. For instance, the regulation ball weighed $6\frac{1}{2}$ ounces and measured $10\frac{1}{2}$ inches in circumference. It was a lively ball (anticipating by 50 years the latest development of the golf-ball), being made with $2\frac{1}{2}$ ounces of rubber, covered with yarn and leather. The bat was unlimited as to length, but was decreed not to exceed $2\frac{1}{2}$ inches in diameter. In the delivery of the ball there was a greater difference than in any other respect as compared with the later development of the game: for the ball could only be pitched; all throws and jerks being prohibited. The pitcher was at liberty to take any number of steps before delivery, and his limit was anywhere behind a line 12 feet across, and 45 feet from the home base. Then, too, he could pitch his ball almost without limitation so long as he pitched "as near as possible to the home base."

As then played, none but amateurs participated; indeed, no one could represent his club unless he had been a member for 30 days, and "money, place, or emolument" was a bar. Games were originally played on free grounds, but on the establishment of the Union Ball Ground and the Capitoline Club of Brooklyn in 1863, the admission money went to the proprietor, the players later having a share, and thus was laid the foundation of professional play. So matters drifted for six years, with a gradual tendency to greater restrictions in rules, greater skill in play, and more and more professionalism, until 1869, when for the first time a salaried team, the "Red Stockings of Cincinnati," began a tour of games, and naturally carried everything before them. Through 1869 and up to June 1870, they played without losing a single game.

The delivery of the pitcher had been gradually developing. As early as 1860 the disguised underhand throw had come into vogue, and by 1866 Arthur Cummings, of the Excelsior Junior

BASEDOW — BASEL

Nine, introduced a curved delivery. With the advent of the swifter-playing professional, and the reduced size and weight of the ball, came into necessity, and therefore into use, the various safeguards, of padded gloves, catchers' mitts, breast-pads, and masks.

By 1871 the game had become so extensive and the professional element so popular that a "National Association of Professional Baseball Players" was formed, and in 1875 the various club-owners took control of the professional players and organized "The National League of Professional Ball Clubs," which continued in undisputed possession of the professional field until 1890, when a rival association, "The American League," was founded. There are several other leagues of minor importance. Baseball naturally found favor in American universities and colleges, but its technique in the early days was crude, even among the best teams. Team play as now interpreted was almost unknown, the hitting was harder, and the fielding poorer, the outfielders played much farther afiel. As late as the middle sixties scores of 50 runs were not uncommon, and a hard-hitting college team would make over 100. As late as 1867, when two college nines made, respectively, 13 and 8, it was considered a phenomenon. There is no intercollegiate championship in the ordinary sense; each college plays a set of games with other colleges. A full and exact knowledge of the game can be acquired only by a study of the official rules. Briefly, the game is played between two teams of nine men each, on a field in which a diamond-shape with sides of 90 feet each has been marked out according to certain technical rules, the angles being named, respectively, the home plate and first, second, and third bases, reckoning to the right from the home plate. The pitcher's "box" is situated near the centre of the diamond, about 60 feet from the batsman's stand, and from that point the pitcher is required to deliver balls to the batsman, pitched according to definite rules. The catcher stands behind the batsman; his principal office is to catch unhit balls and return them to the pitcher, or to throw to the baseman when the batsman is making a run. The fielders are known as the *infield*, consisting of first, second, and third basemen and short-stop; and the *outfield*, or left right, and centre fielders. The office of the first section is to catch batted or thrown balls, and to touch therewith the batsman running between bases, or, failing in this, to return the ball to the pitcher; that of the second section may be stated generally as the stopping or catching of batted balls and returning them to the pitcher or throwing them to the baseman for the purpose of putting out running batsmen. The positions and duties of the fielders are defined with strict limitations by the rules. The aim of each team is to make as many runs as possible. To score a run a player must make a complete circuit of the bases, but not necessarily at one hit. With his own hit he may get as far as first base; then may get to second base while the pitcher is delivering a ball to the second batter, and to the third base on the hit of that man, or even on the hit of the third batsman. When three men are put out, one inning is finished; and the other team takes its turn, with three men one after the other, and so on until there have been nine innings on each side. A batsman is out who is touched by the

ball after leaving one base and before he reaches another, or whose batted ball is caught by one of the fielders before it reaches the ground. The batsman is also declared out when hit by a batted ball; or when being forced to run for a base by reason of all bases being occupied, the ball is held by the fielder at the base for which he is making. The batsman must not step out of his box, and must strike at every ball that crosses "the plate" on a level between his knees and shoulders—such are called "fair balls." If he fails either to strike at or to hit it counts as a "strike" against him, and if he fails three times he is out, providing the third ball is caught by the catcher before it reaches the ground. If the pitcher delivers a ball which does not pass over the plate in the defined zone, it is counted as "one ball" in favor of the batsman, and after four such balls he is entitled to go to the first base unmolested. Baseball has been re-transplanted back to England, but without much success. In Australia it has become popular.

The principal authorities on the game are Spalding's 'Baseball Guide'; 'The Art of Pitching and Fielding, Batting and Base-Running,' by Henry Chadwick (1886); 'Baseball,' in the *Oval Series* (1896); and 'Baseball,' by J. M. Ward (1888).

Basedow, ba'ze-dō, **Johann Bernhard**, often called by himself **BERNARD VON NORDALBINGEN**; German educator: b 11 Sept. 1723; d. 25 July 1790. He had in Dessau an institution for education called *Philanthropinon*. The chief features of Basedow's system are the cosmopolitan character which he endeavored to instil into his pupils, and the full development of the faculties of the young at which he aspired, in pursuance of the notions of Locke and Rousseau. With Salzmann, Campe, etc., he established some good institutions, and deserves special credit for his efforts for the education of the lower classes.

Basedow's Disease (also called **GRAVES' DISEASE**), a peculiar affection of the sympathetic nervous system, characterized by rapid and irregular heart-action, large protruding eyeballs, swelling of the neck, extreme nervousness, and marked muscular tremor. Its exact cause is unknown, but it seems to be associated with some variation in the function of the thyroid gland. It usually occurs in young females and is not infrequently a curable affection, although some patients are incurable. Surgical operations on the cervical sympathetic have cured some cases (See *GOITRE*). Consult: Osler, 'Practice of Medicine'; Nothnagel, 'System of Medicine.'

Basel, bā'zel, **Basle**, or **Bale**, bāl, Switzerland; one of the largest cities in the federation and capital of canton Baselstadt, 43 miles north of Bern. It consists of two parts, situated on opposite sides of the Rhine, and communicating by a long wooden bridge. It is walled and irregularly, though fairly well built; and has an ancient cathedral. Basel was formerly a free imperial city, but joined the Swiss Confederacy in 1501. Buxtorf, Wetstein, Hermann, the Bernouillis, and Euler were born in Basel. Erasmus also lived there several years, and lies buried in the cathedral. Among the institutions of the city are the university, founded in 1459; various collections of paintings, a seminary for missionaries, and a German Bible Society. In 1849 a large museum was completed,

BASEL

which contains the university library (now consisting of about 80,000 volumes, with 4,000 manuscripts, and all the collections belonging to the town. Its manufactures consist principally of ribbons, silk goods, cotton prints, linen, gloves, leather, jewelry, and turnery ware. Its advantageous position on the Rhine, a little below the point where it becomes navigable, and at the terminus of the French and German railways, has made it a centre of trade, and starting point for travelers in Switzerland. It is the seat of a United States consulate. Pop. (1900) about 113,000.

Basel, Confession of, a Calvinistic confession introduced by Ecolampadius at the opening of the Synod of Basel (1531). It was adopted by the Protestants of Basel in 1534. Simple and comparatively moderate in its terms, it occupies an intermediate place between Zwingli and Luther.

Basel, Council of, a council announced at the Council of Constance, and convoked by Pope Martin V., and his successor Eugenius IV. It commenced its sittings 14 Dec. 1431 under the presidency of the cardinal legate Juliana Cesarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Christian nations under the Roman Catholic Church, to put a stop to wars between Christian princes, and to reform the Church. But its first steps toward a peaceable reconciliation with the Hussites, against whom Julianus had unsuccessfully published a crusade, were displeasing to the Pope, who authorized the cardinal legate to dissolve the council. That body opposed the claims of the Pope, with severe animadversions on his neglect of the welfare of the Church, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the Emperor Sigismund, of the German princes, and of France.

In order to secure itself against the attacks of Eugenius IV. it re-enacted the decrees of the Council of Constance concerning the power of a general council (in matters of faith, of schism, and of reformation) to command the Pope, as well as all Christendom, and to punish the disobedience of the clergy, and even of the Pope, by virtue of its judicial character as the representative of the universal Church. It likewise pronounced all the doings and remonstrances of the Pope against its proceedings of no force, and began a formal process against him after he had issued a bull for its dissolution; appointed him, term after term, to appear before its tribunal, and exercised as much as possible the papal prerogatives in France and Germany.

Meanwhile it concluded, in the name of the Church, a peace with the Hussites (whose deputies appeared 6 Jan. 1433, with 300 horse, in Basel, by which the use of the cup in the communion was granted to them. This peace was ratified 20 Nov. 1433 by the Calixtines, the most powerful and finally prevailing party of the Hussites. The council deviated on this point, indeed, from the decrees of the Council of Constance, but was obliged so to do in order to assist its most faithful protector, the Emperor Sigismund, to the acquisition of Bohemia by this compromise with the Hussites, who were not to be subdued by force. The emperor, in

return, effected the reconciliation of the council with Eugenius IV., who, urged by an insurrection in the papal territory, and by the fear of losing all authority in Germany and France, solemnly confirmed its decrees in a bull dictated by the council and accepted at the 16th session 5 Feb. 1434.

Proud of this victory over the Pope, it attempted to interfere in the quarrels of the German princes; but was reminded by Sigismund, who protested against its intermeddling in the affairs of the Crown, of its proper point—the reformation of the Church. Toward the limitation of the power of the Pope, a proceeding which naturally evoked papal opposition, it had already made an important step by depriving him of the disposal of the prebends of cathedral and collegiate churches, which had been obtained by his predecessors; by restoring to the chapters the free election of their officers, and by obliging the Pope to confirm them gratuitously. It proceeded to the reformation of the clergy by ordaining that the excommunicated should not incur the penalties of their sentence before its publication; that interdicts should never be granted at the request of single individuals; and that repeated appeals should not be allowed, on account of their complaints (20th session, 22 Jan. 1435); that the *annates* (qv), the sums paid for the *pallia*, etc., should be regarded as simoniacal, and should not, under any pretext, be demanded or paid in future; that the divine service, the mass, and the canonical hours should be regularly observed by the clergy of each class; that disturbances of public worship should be prevented by a good ecclesiastical police; that the Feast of Fools and all irreverent celebrations customary in the Church about Christmas should be abolished (21st session, 9 June 1435).

In the 23d session (25 March 1436) the form of election, the confession of faith, and the official oath of each Pope, by which he bound himself to obey the decrees of the council, and the annual repetition of the same, were provided for; all preferment of the relations of a Pope was forbidden, and the college of cardinals was limited to 24 prelates and doctors of all nations, who should be elected by the free votes of the college, should be entitled to half of the revenues of the states of the Church, should watch over the Pope, and always sign his bulls. They granted him only the right to dispose of the prebends belonging to the diocese of Rome, and abolished the investiture of Church preferments in reversion.

In the 26th session it again summoned him to appear, on account of his disobedience of its decrees, declared him guilty of contumacy, and, after Eugenius had opened his counter-synod at Ferrara, decreed his suspension from the papal chair in the 31st session (24 Jan. 1438). In the same session it forbade appeal to Rome without resort to the intermediate jurisdictions, left to the papal disposition but 1 out of 10 and 2 out of 50 prebends of a church, and destined the third part of all canonries which might become vacant to men who had taken regular degrees. The removal of Eugenius, however, seemed, on account of the strength of his party, so impracticable, that some prelates, who till then had been the boldest and most influential speakers in the council (for example, the cardinal legate Julianus, and the great canon

BASEL — BASEMENT

Nicholas of Cusa, Archdeacon of Liège, with the most of the Italians), left Basel and went over to the party of Eugenius. The Archbishop of Arles, Cardinal Louis Allemand, a man of superior spirit, courage, and eloquence, was now made first president of the council, and directed its proceedings with much vigor.

Although its number was diminished, its most powerful protector, the Emperor Sigismund, deceased, and its authority doubted by several princes and nations on account of its open rupture with the Pope; yet, in the 33d session (16 May 1439), after violent debates, in which the Archbishop of Palermo, Nic. Tudeschi (known under the name of Panormitanus, as the greatest canon of his time), who was the delegate of the king of Aragon and Sicily, took the part of the Pope—it declared Eugenius, on account of his obstinate disobedience of its decrees, a heretic, and formally deposed him, in the following session, as guilty of simony, perjury, violation of the laws of the Church, and bad administration in his office. At this session (the 34th, 25 June 1439), only two of the Spanish and Italian members were present; but the president adopted a spirited and effectual method for obtaining the decree. He ordered the holy relics which existed in Basel to be placed in the seats of the absent bishops, and produced such a strong excitement in the council, of which only a few remained, for the most part French and German prelates, priests, and doctors, that it unanimously consented to the deposition of Eugenius.

Notwithstanding the plague, then raging in Basel, which continually diminished its number, it proceeded in a regular conclave (17 Nov. of the same year) to elect the Duke Amadeus of Savoy to the papal chair. This prince then lived in retirement at Ripaglia, on the Lake of Geneva, and seemed particularly qualified for the office on account of his piety, his riches, and his connections. But Felix V.,—this was the name he adopted,—was acknowledged by only a few princes, cities, and universities. The chief powers, France and Germany, assented to the decrees of the council for the reformation of the Church, but they chose to remain neutral in the contest with Eugenius. Meanwhile he acquired new credit by the union concluded with the Greek deputies at Florence (but afterward rejected by the Greek Church) and the friendship of the Emperor Frederic III. The council on the other hand, denounced by Eugenius and deserted by its protectors, gradually declined under its feeble Pope, and, consulting only appearances and the personal safety of its members, held its 45th and last session 16 May 1443, after an inaction of three years interrupted only by a few insignificant decrees. At this session the place of meeting was changed to Lausanne. Here some of the prelates remained together under the cardinal Louis Allemand until 1449, when, after the death of Eugenius and the resignation of Felix V., they gladly accepted the amnesty offered by the new Pope, Nicholas V., and pronounced the council closed. The decrees of the Council of Basel are admitted into none of the Roman or official collections, and by the Roman Church are considered of no authority. They have been regarded, however, as of authority in points of canon law, in France and Germany, as their regulations for the reformation of the Church were to some extent adopted

in both countries, and, as far as they regard clerical discipline, were actually enforced. Some concordats concluded at subsequent dates have modified the application of them, but never formally and entirely annulled them. The Council of Basel was one of the most important in the history of the Church. Its history witnesses to the struggle to reform the abuses brought about by the long schism in the Papacy. The spirit of the councils of Pisa (1409) and of Constance (1414-18) was formulated in the decrees of Basel, and led to a twofold result; on the one hand the many salutary decrees of reform, on the other the clear expression of many dangerous principles in regard to the organization of the Church. Its history has often been misrepresented by historians, some seeing in it only an unhappy tendency from the true center of unity, others regarding it as a great progressive movement, but forgetting that it was simply the growth of an expediency due to exceptional conditions. To know it impartially it must be studied in the original sources.

Consult: Hardouin; Labbé; Cossart; Mansi's collection consists of 31 folios.

Basel, Treaties of Peace at, 5 April and 22 July 1795, between Prussia, Spain, and France, in which Prussia and Spain separated themselves from the coalition against France and acknowledged the republic. France retained the Prussian provinces on the left bank of the Rhine until the general peace, and accepted the mediation of Prussia when any German princes wished to conclude separate treaties of peace with it. A secret article was inserted in the treaty, the object of which was to secure compensation to Prussia in case the left bank of the Rhine should remain with France at the general peace. The landgrave of Hesse-Cassel afterward concluded a treaty with the French republic at Basel, 28 Aug. 1795, by which the latter retained possession of the territories of Hesse-Cassel on the left bank of the Rhine until the general peace. By the Peace of Basel all the conquests of France beyond the Pyrenees were restored to Spain, in exchange for which that country ceded to France the Spanish part of the island of St. Domingo.

Basel, University of, an institution opened in 1460. After the Reformation it became strongly Protestant and exerted a widespread influence in behalf of the new faith. Among its professors were Erasmus, Ecolampadius, Euler, and the Bernoullis. It is at present the principal theological school in Switzerland, with departments of medicine, law, and philosophy. Its library contains 230,000 volumes and 1,500 MSS.

Basel'la, or **Malabar Nightshade**, a monotypic but very variable genus of tropical herbs of the natural order *Chenopodiaceæ*. *B. rubra*, a twining annual or biennial plant, native of India, where it is cultivated as a pot herb, is often raised in Europe, and has been introduced into the United States as a substitute for spinach, which it succeeds in season (July until frost). It is decidedly mucilaginous when cooked. Sometimes it is used as a greenhouse climber. One variety bears edible tubers, and another furnishes a purple dye.

Basement, in architecture, the base or lowest story of a building. It should have externally an appearance of strength, but its height

BASEY — BASIL

and proportion to the rest of the edifice are very various, depending on the character of the apartments on the ground floor.

Basey, ba'sā, Philippines, a town in Samar, with a population in 1898 of 13,756.

Bashahr', one of the Punjab hill states, on the lower slopes of the Himalayas, traversed from east to west by the Sutlej; area, 3,320 square miles. The rajah and upper classes in the southern parts are Rajputs, and the people generally are of the Hindu race, but their observance of Hinduism is very partial. The rajah pays tribute to the British government, for which he is required to raise troops in time of war, and by which his sentences of death must be confirmed. Pop. 75,727.

Bashan, bā'shān or ba-shan' (meaning uncertain, perhaps "soft, rich soil"), the name in Scripture for a singularly rich tract of country lying beyond the Jordan, between Mount Hermon and the land of Gilead. These two regions, Bashan and Gilead, attracted the attention of those tribes that desired to continue the pastoral life to which they and their fathers had been accustomed; and Gilead was accordingly divided between Reuben and Gad, while Bashan was given to the half-tribe of Manasseh. Its forests contain magnificent oaks, and the "strong bulls of Bashan" of ancient times are still represented by vast herds of black cattle. Bashan had been the kingdom of the Canaanite giant Og, whom Moses destroyed; and one district of the country, Argob, had at that time 60 fenced cities, with walls, gates, and bars, besides many unwall'd towns, remains of which are yet to be seen. Among the cities of this region were Edrei, Kenath, Golan, and Bozrah. After the captivity it is mentioned as divided into Trachonitis (the ancient Argob), Gaulanitis (Golan), Auranitis (Hauran, mentioned by Ezekiel), and Batanæa, or Bashan proper.

Bashford, James Whitford, American clergyman: b. Fayette, Wis., 27 May 1849. He was graduated at the University of Wisconsin in 1873, and at the Theological School of Boston University in 1876; became instructor of Greek at the University of Wisconsin in 1874, and president of the Wesleyan University of Ohio in 1889. His works include 'Science of Religion,' numerous published sermons, and contributions to periodical literature.

Bashi-Bazouks', irregular troops in the pay of the Turkish Sultan. They are a wild, turbulent body of men, mostly from Turkey in Asia, and in the duties with which they are entrusted resemble the Cossacks in the Russian army. In the spring of 1876 the Bashi-Bazouks were guilty of great atrocities in checking a threatened insurrection in the district around Philippopolis in eastern Rumelia.

Bashi' Islands. See BATAN ISLANDS.

Bashkirs', or **Bashkeers'**, a tribe of half-civilized people subject to Russia, and inhabiting the banks of the Ural and Volga. They are probably descended from the Nogay Tartars and resemble them in their manners. They formerly roamed about, under their own princes, in southern Siberia. To avoid the Siberian khans they settled in their present territory, extended themselves along the Volga and the Ural, and submitted to the khan of Khasan. At the time when this state was overthrown

by Ivan II. they voluntarily took refuge under the Russian sceptre; but their frequent revolts long prevented their increase and kept them in a weak condition. They number about 500,000, and inhabit chiefly the governments of Orenburg, Perm, and Samara. They are Mohammedans, and live chiefly by hunting, the breeding of cattle and horses, and keeping of bees. They prepare from mare's and camel's milk a fermented beverage, *koumiss* (q.v.), which is their favorite drink. They furnish the Russian army with a body of irregular cavalry.

Bashkirtseff, bash-kērt'sēf, **Marie**, Russian author: b. Russia, 1860; d. Paris, 1884. She came of a noble and wealthy family, went to Italy to study singing, and to Paris to study art. Her fame rests on her private 'Journal,' which seems to have been written with ultimate publication in view. It begins with her 13th year and continues through her later life. According to her own words, it was intended to be "the transcript of a woman's life." It appeared in Paris in 1885, and was abridged and translated into English in 1889, and was called by Gladstone "a book without a parallel." Like Rousseau's 'Confessions,' it claims to be an absolutely candid expression of individual experience. From the age of three years she cherished inordinate ambition, and felt herself destined to become great as singer, writer, artist, or queen of society. Admiration was essential to her, and she records compliments to her beauty or her erudition with equal pleasure. Her life was a curious mixture of the interests of an attractive society girl with those of a serious student. Her chronic discontent was due to the disproportion between her aspirations and her achievements. She was never self-conscious, and her book reveals her longings, her petty vanities, and her childish crudities, as well as her versatile and brilliant talents.

Basic Slag, the slag of refuse matter which is obtained in making basic steel, and which, from the phosphate of lime it contains, is a valuable fertilizer.

Basic Steel. See STEEL MANUFACTURE

Basil, bā'zīl or bāz'īl, **Saint**, surnamed THE GREAT, Bishop of Cæsarea, Cappadocia: b. about 326; d. 380. He was studying in Athens in 355, and there became the friend of Gregory, afterward Bishop of Nazianzen. He was baptized in 357, and after extensive travels retired to the desert of Pontus and there founded an order of monks named Basilians. He succeeded Eusebius in the see of Cæsarea in 370, and by his opposition to Arian doctrines greatly offended the Emperor Valens. The liturgy of St. Basil is still used in the Eastern Church.

Basil I., emperor of Constantinople: b. Macedon, of poor parents, about the beginning of the 9th century; d. 886, from a blow given him by a stag while hunting. In his 25th year he made his way to Constantinople, and gained the favor of an archimandrite, who procured him service with an officer of the court of the Emperor Michael III. Later he was appointed head-chamberlain to the emperor. Despite intrigues against him he advanced so rapidly in the emperor's favor that he was adopted as his colleague. He murdered his chief rival, Bardus, and knowing that Michael had rendered himself odious by his cruelty and debauchery, he headed

BASIL — BASILICA

a body of conspirators and murdered him in his bed in 867, and assumed sole occupancy of the throne. Notwithstanding his criminal acts, he proved an able and equitable sovereign; paid equal attention to the internal administration and the foreign relations of the empire, and, not overlooking even its religious interests, sent an archbishop into Russia and laid the foundation of that ascendancy which the Greek Church has so long possessed in that country. He compiled a body of laws called the *Basilica*, which, augmented by his son and successor, **LEO THE PHILOSOPHER**, were in force till the fall of the empire. Basil I. deprived Photius of the see of Constantinople, and restored Ignatius; but on the death of the latter he recalled Photius. He successfully carried on war with the Saracens. The versatility, if not the depth of his intellect, is strikingly displayed in his exhortations to his son Leo, which are still extant.

Basil II., emperor of the East. d. 1025. On the death of his father, the Emperor Romanus the Younger, in 963, he was kept out of the succession for 12 years by two usurpers; the first, Nicephorus II (Phocas), who died in 969, and the second, Johannes (John) Zimisces, who associated Basil and his brother Constantine with him in the empire in 975, and died the following year, leaving the whole power to Basil although Constantine was still his colleague in name. His reign was almost a continuous warfare, in which the contending parties seemed to vie with each other in committing deeds of cruelty. In 1014, after a great victory over the Bulgarians, in which he had taken 15,000 prisoners, he had 99 out of every 100 deprived of their eyes and thus sent home. This horrible cruelty caused the death of Samuel, king of the Bulgarians. The war ended in 1019 by the complete conquest of Bulgaria.

Basil (*Ooimum*), a genus of fragrant annual herbs of the natural order *Labiata*, natives of warm climates, cultivated for culinary purposes and for ornament. The species generally raised are sweet basil (*O. basilicum*), bush or dwarf basil, (*O. minimum*), (considered by some botanists a form of *O. basilicum*), and tree basil (*O. gratissimum*). The name basil is also applied to certain species of several other related genera; for instance, *Pycnanthemum* and *Calamintha*. For culture and uses, see **HERBS** (*Culinary*.)

Basilan, ba-sē'lan, Philippines, the largest island of the Sulu Archipelago. It is of oblong form, about 36 miles long and situated south of Mindanao, from which it is separated by a strait nine miles wide. The island is very mountainous, and most of it is covered by virgin forests. The soil is extremely rich and produces a variety of valuable crops, including cotton, coffee, sugar, chocolate, tobacco, indigo, and spices of all sorts. Basilan has about 15,000 inhabitants and three excellent harbors. The name is also applied to the whole group of 34 adjacent islets. The leading port is Isabela, on Basilan Strait.

Basil'ean Manuscripts, two manuscripts of the Greek New Testament, now in the library of Basel: (1) a nearly complete uncial copy of the Gospels of the 8th century; (2) a cursive copy of the whole New Testament except the Apocalypse, of the 10th century.

Basil'ian Liturgy, that form for celebrating the eucharist drawn up, toward the close of the 4th century, by Basil the Great, still used in the Greek Church.

Basilian Monks, a monastic order, chiefly belonging to the Greek Church, which strictly follow the rules of St. Basil (q.v.), who, after visiting the monasteries of Egypt, Syria, and Palestine, induced many to enter and even to found convents. His rule was confirmed by Pope Liberius in 363. In 379 there were at least 80,000 in the Eastern monasteries. Many convents were dispersed in the 8th century, during the Iconoclast persecutions, and all began to languish about the time of the Eastern schism. The order comprises priests, lay-brothers, cenobites living in community, anchorites in cells, and hermits in solitudes. They are governed by an archimandrite who has several convents under his jurisdiction, and by exarchs deputed by the archimandrite to visit the convents. The order has developed more extensively in Russia than in other countries. In Austria, Poland, and Hungary there are many communities, known as Ruthenians, in union with Rome. In Italy also they had convents in Calabria, Sicily, and Naples. In Spain they flourished for nearly two centuries until 1835. The communities of Sisters of this name were founded by St. Maerina, sister of St. Basil. Other communities following the rule of St. Basil are the Melchites, with about 600 houses in Libanus; the Bartholomites of the Armenian rites, so called because, after taking refuge in Genoa in 1307, they had possession of St. Bartholomew's church there until 1659. This name is likewise given to a community of secular priests founded by Bartholomew Holzhauser in Germany in 1640, and once propagated in Hungary, Poland, and Spain, but now extinct. There are but six Basilians in the United States (in Chicago) affiliated to the provincial house in Toronto, Canada.

Basil'ica (literally, a royal hall, originally the hall occupied by the *archōn basileus* or "king archon" among the ancient Athenians), the name of buildings belonging to classical antiquity, which acquired their characteristic form among the Romans. In the first centuries of the Christian era the Roman basilicas were splendid public buildings, of an oblong shape, commonly adorned with columns and statues, where the citizens collected to consult for their common welfare, the merchants exposed their wares, young orators exercised themselves in declamation, etc. Constantine the Great gave some basilicas to the Christians in Rome for their worship. Thence it happened that the first Christian churches obtained the name of *basilicæ*. But in the 4th century after Christ the ancient form of the basilica began to be modified and to receive further developments. The chief changes that from that time onward were gradually made in its construction consisted in the raising of the nave above the rest of the building, the introduction of upper windows, the addition of the transepts, and the decoration of the interior with works of mosaic. At a later time towers were introduced, and still later vaulted roofs instead of the flat timber roofs with which they were formerly provided. The original church on the site of which St. Peter's is built was a basilica, and hence the

BASILICA—BASILISK

name is often applied to the present church, which is not, strictly speaking, a basilica.

Basilica, a code of laws founded on the code of Justinian, supposed to have been named after the Greek emperor Basilus I., in whose reign its compilation was begun. It was finished by Leo the Philosopher, and revised by order of his son Constantine Porphyrogenitus in 945. It consisted of 60 books, but we no longer possess them in a complete form. The principal editions are those of Fabrot (7 vols., Paris, 1647), and Heimbach (Vols. I-V, Leipzig, 1833-50).

Basilicata, *bā-zīl-ē-cā'tā*, the ancient Lucania, in southern Italy, composed solely of the province of Potenza; so called after the Emperor Basilus II., who reconquered it from the Saracens and Lombards in the 11th century. It is mountainous, several peaks rising to upward of 4,500 feet (Monte Pollino, 7,375 feet). The Apennines here divide into two parts, which branch off to the east and west. From these the rivers Bradano, Basento, Salandrella, Agri, and Sinni take their source, and, after draining this fertile district, fall into the Gulf of Taranto in the Ionian Sea. There are also many lakes, some of volcanic origin. The chief are Monticchio, Pesole, Maorno, and Santa Palagina. The bulk of the people are poor and ignorant, and talk a dialect called *basilisco*. Its coast line being for the most part marshy, and, as a consequence, unhealthful, the province derives next to no commercial benefit from it. The orange and lemon grow well near the coast. Other products are cotton, flax, silk, honey, wax, licorice, dried fruit, saffron, tobacco, etc. Mineral springs are many, chiefly sulphurous. There are marble quarries at Avigliano, Latronico, Muro, Lucano, and Picerno; chalk at Mauro Forte and Montemuro; transparent quartz at Lagonegro; tufa at Matera; and excellent lignite at San Chirico Raparo and Rotonda. Area, 3,845 square miles; pop. (1901) 490,000.

Basilicon, *ba-zīl'ī-kōn*, a name of several ointments, the chief ingredients of which are wax, pitch, resin, and olive oil.

Basilicon Do'ron (the royal gift), the title of a book written by King James I. in 1599, and printed in Edinburgh in 1603, containing a collection of precepts on the art of government, and maintaining the claim of the king to be sole head of the Church.

Basilides, *ba-sīl'ī-dēz*, founder of one of the most remarkable sects of ancient Alexandria. He lived under the reigns of Trajan, Adrian, and Antoninus, but the place of his birth, supposed to be in Persia, Syria, or Egypt, is unknown. He was well acquainted with Christianity, but, under the pretense of freeing it from corruption, corrupted it still more by mixing it up with the wildest dreams of the Gnostics and peopling the earth and the air with multitudes of æons. He had numerous followers, who spread from Syria and Egypt into Italy, and even as far as France, but they suddenly sank into obscurity and are scarcely heard of after the 4th century.

Basil'io da Gama, *gā'mā*, **José**, a Brazilian poet: b. San José, 1740; d. Lisbon, 1795. His principal poem gives a picturesque and romantic account of the bloody wars which the Por-

tuguese waged, in 1756, against the natives of Paraguay. He was a protégé of the Brazilian minister Pombal, who gave him employment in his Cabinet. He shared Pombal's exile, and also dedicated verses to him in token of his gratitude. On his return to Rio de Janeiro he was favorably received by the authorities and the literary notabilities, and with their co-operation he became one of the founders of the first Brazilian academy. In 1790 he again had to resort to flight, and he succeeded in escaping to Lisbon. He was the author of many lyrical pieces and sonnets, and of a poem, 'Quitubia,' written on an African chieftain whose devotion to Portugal engaged the poet's sympathy; but the most abiding monument of his genius is his 'Uruguay,' which is still popular wherever the Portuguese language is known.

Basilis'cus, brother of Verina, wife of Leo, emperor of the East: d. 477. In his youth he obtained some successes against the Scythians, and in 468, through the influence of his sister, was appointed to command the immense armament fitted out at Constantinople against Genseric, king of the Vandals in Africa. This expedition consisted of upward of 1,100 vessels, conveying soldiers and sailors to the number of more than 100,000 men, and its equipment is said to have cost about \$25,000,000. But this vast fleet, after reaching the coast of Africa in safety, was altogether destroyed or dispersed by Genseric, through the incapacity or treachery of its leader. Basiliscus escaped to Constantinople, and obtained the pardon of the emperor only by the earnest intercession of the empress. After the death of Leo, and of his successor, Leo II., in 474, Basiliscus usurped the imperial throne. But he was unable to sustain himself in this position, and was not long after overthrown and put to death by Zeno, the legitimate heir.

Basilisk, *bāz'ī-līsk*, according to Pliny (lib. viii. c. 21), a kind of serpent found in the African deserts, named *basiliskos*, or little king, because its body was marked with bright spots, and those on the head had the appearance of a crown or diadem. It had a very pointed head, with fiery eyes, and was of a dark color, verging to blackness. All other snakes were said to fly from the sound of its hissing; and instead of trailing along like other serpents the basilisk raised its body nearly erect, and, as it passed along, killed the herbs and fruits by its touch, and even by its breath. Yet this monster was destroyed by weasels. If these fables had reference to any real animal, it is probable that it was a species somewhat similar to the *cobra de capello*, or the asp viper. Both are accustomed to erect a very considerable part of the body, though not to move forward in this way. It is highly probable that the basilisk of the ancients was merely a creature of fiction.

The name is now applied to one of the Central and South American lizards of the family *Iguanidæ* and genus *Basiliscus*, remarkable for the high and erectile crests which are developed along the back and tail of the males. They have long legs and long flexible toes, enabling them to climb trees with great activity. They prefer such trees as overhang the water, into which they plunge at any sign of danger. They feed entirely upon vegetable matter. The best-known species is *Basiliscus americanus*, which

BASILOSAURUS—BASKET

has a length of nearly three feet, three fifths of which is tail. In color the basilisks are green and brown, with dark cross-bars on the back, and the crest of the males is red. In early spring they lay about a dozen eggs in a hole among the roots of a tree. See also IGUANA.

Basilosaurus. See ZEUGLONDON.

Ba'sin, in physical geography, the whole tract of country drained by a river and its tributaries. The line dividing one river basin from another is the watershed, and by tracing the various watersheds each country is divided into its constituent basins. The basin of a lake or sea comprises as well all the territory drained by the rivers which run into it. Such hydrographic basins owe their origin either to erosive action or to a depression of the earth's crust. When rivers become established upon a new land surface they proceed to deepen and widen their channels, and in course of time may appreciably lower the level of the drainage area. Glaciers are also important agents in the establishment of hydrographic basins, as is illustrated by the numerous rock basins (now occupied by lakes) that were hollowed out by the great ice-sheets that once invaded northern North America and Europe. Other depressions have been formed by vertical movements of the strata comprising the earth's crust. The Great Basin lying between the Rocky Mountains and the coast ranges, and many of the lake basins of central Africa, originated in this way. In geology a basin is the synclinal arrangement of strata so that they dip or are inclined toward a common centre. The Paris Basin and the London Basin are familiar instances. See RIVER; LAKE; VALLEY; etc.

Bas'ingstoke, England, a town and parish of Hampshire, situated near the source of the Loddon, 18 miles north-northeast from Winchester. Its streets are well built, paved, and lighted, and the town is amply supplied with water. It has a town-hall, containing a spacious corn-market and ball-room. It has also a fine Gothic church, erected in the time of Henry VIII; several other places of worship; a mechanics' institute, with good library; and numerous charities. A considerable trade is carried on in corn and malt. Population of municipal borough (1901) 9,810.

Bas'kerville, John, English printer and artist: b. Wolverley, Worcestershire, 1706; d. 1775. Inheriting a small estate, he was brought up to no profession, but, acquiring great skill in penmanship and carving letters on stone, at the age of 20 he settled at Birmingham as a writing-master. He subsequently engaged in the manufacture of japanned works, and in 1750 entered upon his great career as printer and typefounder, in which he displayed extraordinary ability, as well as in the manufacture of the ink and paper used in his productions. His first great work was an edition of Virgil, in royal quarto, 1756, which was followed by many of the Latin classics, and some English ones, in quarto and smaller sizes. After his death his types and matrices were sold to Beaumarchais at Paris for £3,700.

Basket, a vessel made of osier twigs or other flexible materials, as rushes, strips of wood, splits of bamboo, rattan, etc., and used for holding and carrying all sorts of commodi-

ties. The word is of Britanno-Celtic origin and still subsists in the Welsh language in the form *Basgawd*, from *Basg*, plaiting, net-work: it was adopted into the Latin language in the 1st century with form little altered—*Bascauda*. The baskets made in Britain were highly prized by the Romans, and the poets Juvenal and Martial make mention of them as articles of no trifling value. They were evidently regarded as rare exotic curios in Juvenal's day, for the poet, in drawing an exaggerated picture of the shipwreck in which his friend Catullus threw overboard his most cherished possessions, couples *Bascaudæ* (baskets) with articles of chased silver wrought by famous artists (Sat. xii). And Martial (xiv. 99) makes the British basket say of itself—

Barbara de pictis veni bascauda Britannis,
Sed me jam mavult dicere Roma suam—

"The Basket Barbaric, I'm come from the painted
Britanni,

But Rome now would choose rather to title me Roman."

In primeval times basket-making was a branch of the art of weaving, and both of these arts grew out of the still more primitive one of wattling, first employed in making enclosures. Tylor ('Early History of mankind') notes the existence of wicker-weaving among primitive tribes throughout the world. This is the first step in the art of weaving textile fabrics. It is practised, or rather was practised, by the natives of New Zealand and of northwestern America, and as late as 1856 by an Indian tribe living northwest of Lake Huron. In the lake habitations of Switzerland have been found specimens of wicker-weaving work consisting of strands of untwisted fibre, probably hemp, bound together by transverse strands wattled in among them; and in the same localities have been found specimens of the same kind of weaving but of a progressively higher and finer type. There is even a genetic relation between the arts of basket-making and pottery, proved by specimens of rude pottery found in all quarters of the world: in these are seen the impresses of the basket-work on which the clay was molded and which was burnt away in the kiln. Even after the art of molding the clay without the basket-work frame was invented, the potters seem to have imitated the markings left by it. Among the Indians of the Mississippi valley along the gulf, all pottery vessels of large size used to be modeled in baskets of willow or splints, which, being burnt off, their markings remained. Shields of basket-work covered with hide were in use among the Britons at the time of Cæsar's invasion, and similar shields are still employed by primitive peoples wherever they live in savage isolation. Boats, too, of basket-work, with a covering of hide (coracles), were used by the ancient Britons, and boats of the same type were seen by Herodotus (I. 194) navigating the Euphrates. These were of round form, without distinction of bow and stern, and similar boats are still in use on some rivers in India. On account of its lightness, combined with strength and durability, basket-work is preferred to joinery in the manufacture of various commodities, as window-screens, pony-carriage bodies, chairs, tables, etc. In South America the natives weave of rushes baskets capable of holding liquids, and those of Tasmania, now

BASKET-BALL — BASKET-FISH

extinct, used to weave of leaves water-tight vessels. The material most commonly employed in basket-making is the willow or ozier twig, and the production of this material is an important industry in France, Germany, Belgium, Holland, and Britain. The product of France and Britain is the most highly esteemed for firmness, toughness, and evenness; that of Germany is reputed inferior to the French, the Dutch product is in least esteem, being soft and pithy. Besides ozier twigs, a great variety of other materials are employed in basket-making. In this country coarse, strong baskets are made of shavings or long broad splits of various tough woods. In China and Japan the usual materials are bamboo and rattan, and the Chinese and Japanese excel in the manufacture of wares of these materials, their products being unrivaled for fineness, elegance, and finish; and some of their work, as in the encasing of the egg-shell porcelain of the Japanese is marvelous for the delicacy of the manipulation: even the examples seen in our marts, of common little porcelain saucers so encased in basket-work, are worthy of admiration for painstaking workmanship. The fronds of the Palmyra palm, originally employed in India in making "Cajan" baskets, now afford a staple material for use in the art throughout the world. So, too, *Phormium tenax*, native of New Zealand, which yielded to the natives of that country their peculiar basket-making material, is now employed in all countries for the same purpose.

Basket-making is one of the simplest of the mechanic arts, and the workman, in making baskets designed for use, not for ornament or to please the fancy, has no absolute need of tools or apparatus beyond those requisite for cutting the rods and interlacing them—a knife and a bodkin, with a mallet to beat them into place. The process can be learned in principle by inspection of a basket-maker at work in fashioning a basket from the foundation to the rim. Having provided a sufficient quantity of rods or splints of much greater length than the proposed dimensions of the finished work, he lays a number of them on the floor in parallel pairs at small intervals in the direction of the longer diameter of the basket: this is the woof, so to speak. Then these are crossed at right angles by two of the largest osiers, with their thick ends toward the workman, who sets his foot upon them; next, each of these is woven alternately over and under the lengthwise parallel pieces, and thus the parallel pieces are held fast; this is the "slath,"—the foundation. Now the end of one of the two transverse rods is woven over and under the lengthwise rods all round the bottom till that whole rod is worked in; and the same is done with the other transverse rod, and then additional long osiers are woven in till the bottom is of the required size. The bottom is now finished and work begins on the superstructure by driving the sharpened large ends of a sufficient number of long, stout osiers between the rods at the bottom from the edge toward the centre: these are the ribs or skeleton, being set up in the direction of the sides; between these ribs other rods are woven in till the structure reaches the desired height. To finish the edge the ends of the ribs are turned down over each other and thus compactly united. A handle is added by forcing two or three sharpened rods of

the requisite length down through the weaving of the sides, close together, and pinning them fast a little below the brim; the rods are then either bound or plaited in any way the workman chooses.

Our North American Indians were once among the most expert basket-weavers in the world. Now only the older Indians know the art, and certain tribes whose work was incomparably fine and beautiful have already lost it. After much pauperizing under the abominable reservation system, it was decided that the Indians needed an industry to save them from sinking still lower. Lace-making, after Brussels and French patterns, was first superimposed on a Minnesota reservation, whence it has spread. Now, lace-making, which has been developed by the European woman, fits her like a glove; and quite as truly, basket-making fits the Indian like a moccasin. Yet the Indians have succeeded at making lace, for they have remarkable skill with the fingers. An enlightened administrator of Indian affairs has taken up the task of human development in the right way and has made plans to revive basket-making by introducing it into the Government Indian schools, where the children, who now know nothing of this beautiful art, may learn from the only masters capable of teaching them—their own people, directed by white teachers who know the needs of the constantly widening market. Hundreds of thousands of dollars' worth of baskets are imported from Japan and Germany every year—money which by every right should be earned by our capable and needy Indians; and better than the money they will earn is the satisfaction of doing what they do with surpassing skill.

Basket-ball, a distinctly American game. Its history begins in 1891, when a lecturer in psychology at the Young Men's Christian Association Training School in Springfield, Mass., suggested, as an exercise of inventiveness, a game that would comply with certain conditions. One of his pupils, James Naismith, taking note of the hypothetical conditions indoors,—limited area, limited number of contestants, equally applicable to either sex, etc.,—applied his mind to meet those conditions, and invented "basket-ball."

It is played on a marked oblong square containing not more than 3,500 feet of actual playing-space, by teams of five each, known respectively as centre, left, and right forwards, and left and right backs. The ball is round and inflated, not less than 30 nor more than 32 inches in circumference, and very like that with which "Association" foot-ball is played. The goals are hammock nets of cord, suspended from metal rings 18 inches in diameter, and placed 10 feet from the ground, in the centre of the ends of the playing-space. The time of playing, for seniors, is two halves of 20 minutes, with an interval of 10 minutes; and for juniors, two halves of 15 minutes, with a similar interval. No kicking of the ball with the foot, or hitting with the fists, is permitted; the ball must be held by the hands only.

For rules, and much other necessary information for actual playing, consult Hepbion's 'Official Basket-Ball Rules.'

Basket-fish, a name given about 1670 by John Winthrop, governor of Connecticut, to the *Astrophyton agassizii*. It belongs to the

BASKET-WORM — BASS

group *Euryalida*, and is allied to the sand-stars, but differs in the arms being much branched and ending in long slender tendrils which are so much interlaced as to suggest basket-work. It is very large, the disk being two inches across, and the entire animal often a foot in diameter. It lives off the coast of New England in from 10 to 100 fathoms of water. Other names are "Medusa's-head," and "Sea-basket."

Basket-worm. See BAG-WORM

Baskett, James Newton, American zoologist. b. Kentucky, 1 Nov. 1849. He was graduated at the Missouri State University in 1872. He has devoted himself to the study of comparative vertebrate anatomy, with ornithology as a specialty. In 1893 he presented a paper on 'Some Hints at the Kinship of Birds as Shown by Their Eggs' at the World's Congress of Ornithologists in Chicago. Among his publications are 'The Story of the Birds'; 'The Story of the Fishes'; 'The Story of the Amphibians and Reptiles'; 'The Story of the Mammals'; 'At You-All's House' (a novel); 'As the Light Led' (a novel), etc.

Masking-fish, or Masking-shark. See SHARK.

Basle. See BASEL.

Basnage, ba-nazh, a family of French Protestants, remarkable for the number of able men and eminent writers whom it has produced.

1 NICOLAS, who, having espoused the doctrines of the Reformation, was compelled by persecution to take refuge in England, where he became the minister of a congregation at Norwich. When, by the accession of Henry IV., a better era began to dawn, he returned to his country and officiated, till his death, as minister of a church at Carentan.

2 BENJAMIN, son of the former. b. 1850; d. 1652. He succeeded his father in his charge, and held it for the long period of 51 years. He long held a prominent place among the reformers of France. presided in the assembly held at Rochelle in 1622; undertook the dangerous task of negotiating for English aid; traveled into Scotland to arouse the Protestant feeling in that country; and on his return took the lead in the important synods held at Charonton in 1623 and 1631, and at Alençon, in 1637. His principal work, entitled, 'Treatise on the Church,' is a good specimen of his talents.

3 HENRY DE FRANQUENAY: b. 1615; d. 1695. He was the youngest son of Benjamin, studied for the bar, and as a provincial advocate in Rouen long stood at the head of his profession. His eloquence, learning, and unsullied integrity secured him the esteem, not only of the Protestants, whose views he held, but even of those most violently opposed to him. His complete works, confined to juridical subjects, were published at Rouen in 2 vols. folio in 1778.

4. JACQUES, eldest son of Henri: b. Rouen, 1653; d. 1723. He is the best-known and perhaps the ablest member of the family. He studied theology at Geneva and Sedan, and in 1676 became minister of the Protestant Church at Rouen. In 1685 his church having been closed by decree of Louis XIV., he removed to Holland and officiated as minister, first at Rotterdam, and then permanently at The Hague. Among his works may be mentioned 'History of the Church,' 2 vols. folio; 'History of the

Jews,' 15 vols. 12 mo.; 'Annals of the United Provinces,' 2 vols. folio; and 'The Holy Communion.'

Basques, bäsks, or **Biscayans**, in their own language, EUSCILDUNAC; a remarkable race of people dwelling in the southwest corner of France, and in the north of Spain, on both sides of the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. The French Basques (Gascons) settled, at the end of the 6th century, on the north side of the Pyrenees, between those mountains and the Garonne. After long struggles they submitted to the kings of the Franks. Under the Carolingian race they elected their own dukes, but after the extinction of that family they fell under the dominion of Aquitania in the 11th century, and with it under that of France in 1453. The Basques preserve their ancient language, former manners, and their national dances, and make admirable soldiers, especially in guerrilla warfare, to which their native temperament inclines, and their frequent expeditions in carrying on the smuggling, to which they are much addicted, insure them. They are good seamen, and were the first Europeans who engaged in the whale-fishery, which they have, however, long since relinquished. They occupy, in Spain, the provinces of Biscay, Guipuzcoa, and Alava; in France, the departments of the Upper and Lower Pyrenees, Ariège and Upper Garonne. See BISCAY.

Basra. See BASSORA.

Bass, Edward, first Protestant Episcopal bishop of Massachusetts: b. Dorchester, Mass., 23 Nov. 1726; d. Newburyport, Mass., 10 Sept. 1803. He was graduated at Harvard in 1744; was ordained in England in 1752; and later became pastor of the church at Newburyport, Mass. During the Revolution he omitted from the church service all reference to the royal family and the British government. For this he was expelled from the Society for the Propagation of the Gospel. In 1797 he was consecrated bishop of Massachusetts, and finally also of New Hampshire and Rhode Island.

Bass, Michael Thomas, English brewer: b. 1709; d. 1884. He became head of the Burton brewing firm of Bass & Company upon the death of his father, and was a member of Parliament from 1848 to 1883. His benefactions were very numerous, and included the building and endowing of St. Paul's Church, Burton (the total expenditure on the parish being about \$500,000); and the establishment of recreation grounds, a free library, and swimming baths for Derby, at a cost of \$185,000. Of simple tastes, he more than once declined a baronetcy and a peerage.

Bass, the name of various trimly shaped, active, gamy fishes of both fresh and salt water, mostly in northern regions. The term was originally applied to the *Morone labrax* of the west coast of Europe, and was thence transferred to many other fishes having a real or fancied likeness to this in appearance and qualities. This fish represents the sea-perch family, *Serranida*, is perch-like in form, usually 12 to 18 inches long, and frequents the shoal shorewaters in great numbers, being noted for its fierceness and voracity. Its flesh is excellent. The same family and genus are represented in North America by many species, of which the

BASS—BASS ROCK

nearest relative is the yellow bass (*M. interupta*) of the southern Mississippi valley. It is a brassy-yellow with seven very distinct black longitudinal lines, those below the lateral line being interrupted posteriorly, the posterior parts alternating with the anterior. Its body is oblong-ovate with the back much arched. The dorsal fin and anal spines are stout. It is a light fish for its length, ordinarily weighing one to two pounds, but often measuring 12 to 18 inches, and weighing five pounds. It is very gamy, and is esteemed by some anglers the equal of the black bass in this respect.

In the same family falls the well-known striped bass or "rock fish" (*Roccus lineatus*), of the northeastern Atlantic, which approaches the coast and enters fresh water only at spawning-time, when it ascends the rivers. It was absent from the Pacific coast until planted there artificially, since which it has multiplied from Puget Sound to lower California. The largest fish are to be found in Chesapeake Bay, where they average from 30 to 50 pounds in weight, and occasionally reach double that. In color they are brassy-olive, the fins and sides rather pale, and the latter marked with seven or eight blackish stripes. The favorite way of fishing for the striped bass is by casting a "squid" through the surf, using as a bait pieces of clam, shrimp, or crab; but they will rise to a fly; and on the Pacific coast are easily lured by a shining spoon-bait.

The white bass (*R. chrysops*) is a near relative of the striped bass, and inhabits the Great Lakes from the St Lawrence to Manitoba, and southward in the Mississippi valley to Arkansas. Its preference is for still waters, and it is even lighter in weight for length than the yellow bass. It is generally taken with bait, though it will rise to the fly. It is silvery in its color, tinged with golden below, with dusky lines along the sides.

The most important of the American freshwater bass are the black bass—two species of percoid game fishes of the distinctly American family *Centrarchida*, which also contains the various sunfish (q.v.). One is the "big-mouthed" and the other the "small-mouthed" black bass. Both were originally confined to the waters of the upper Mississippi valley, and Great Lakes region, but in 1853 they were introduced into the head waters of the Potomac River, whence they have spread into all the rivers that empty into Chesapeake Bay. More recently bass have been introduced into New England and into many of the far western States; as well as transported into England, France, Germany, and other countries. The body is oblong, compressed, the back not much elevated, head oblong-conic, lower jaw prominent, teeth on jaws, vomer and platines in broad villiform bands, the inner depressible, usually no teeth on tongue. Black bass vary greatly in size in different waters. The small-mouthed, however, seldom exceeds six pounds in weight, while the large-mouthed, especially in the South, is larger, running as high as 14 pounds. In color both are dull golden-green with a bronze lustre, the scales on the cheeks are more minute than those on the body, and the dorsal fin is deeply notched. In the small-mouthed species (*Micropterus dolomieu*) the maxillary does not extend beyond the eye, and the scales on the cheek are arranged in 17 rows.

In the large-mouthed (*M. salmoides*) the maxillary extends beyond the eye and there are but 10 rows of scales on the cheeks. The lateral line in both is nearly straight, passing from the upper edge of the gill-cover to the centre of the base of the caudal fin. The small-mouthed has the wider range, extending from the Red River of the North to Texas and Mexico. Both varieties are free, but capricious, biters, and both are game fighters. They are taken with artificial flies, such as the "Rube Wood," "Seth Green," "silver doctor," and "Parmachenee bell," as well as by casting with a wide range of natural baits, such as crayfish, minnows, worms, and small frogs; or they may be taken by trolling from a boat, using a stiff rod, especially in lakes, with any standard silver or golden spoon-bait. In some districts the large-mouthed bass is called "straw" bass; in others "slough," "lake," "marsh," or "Oswego" bass, or "green trout," "welchman," etc.

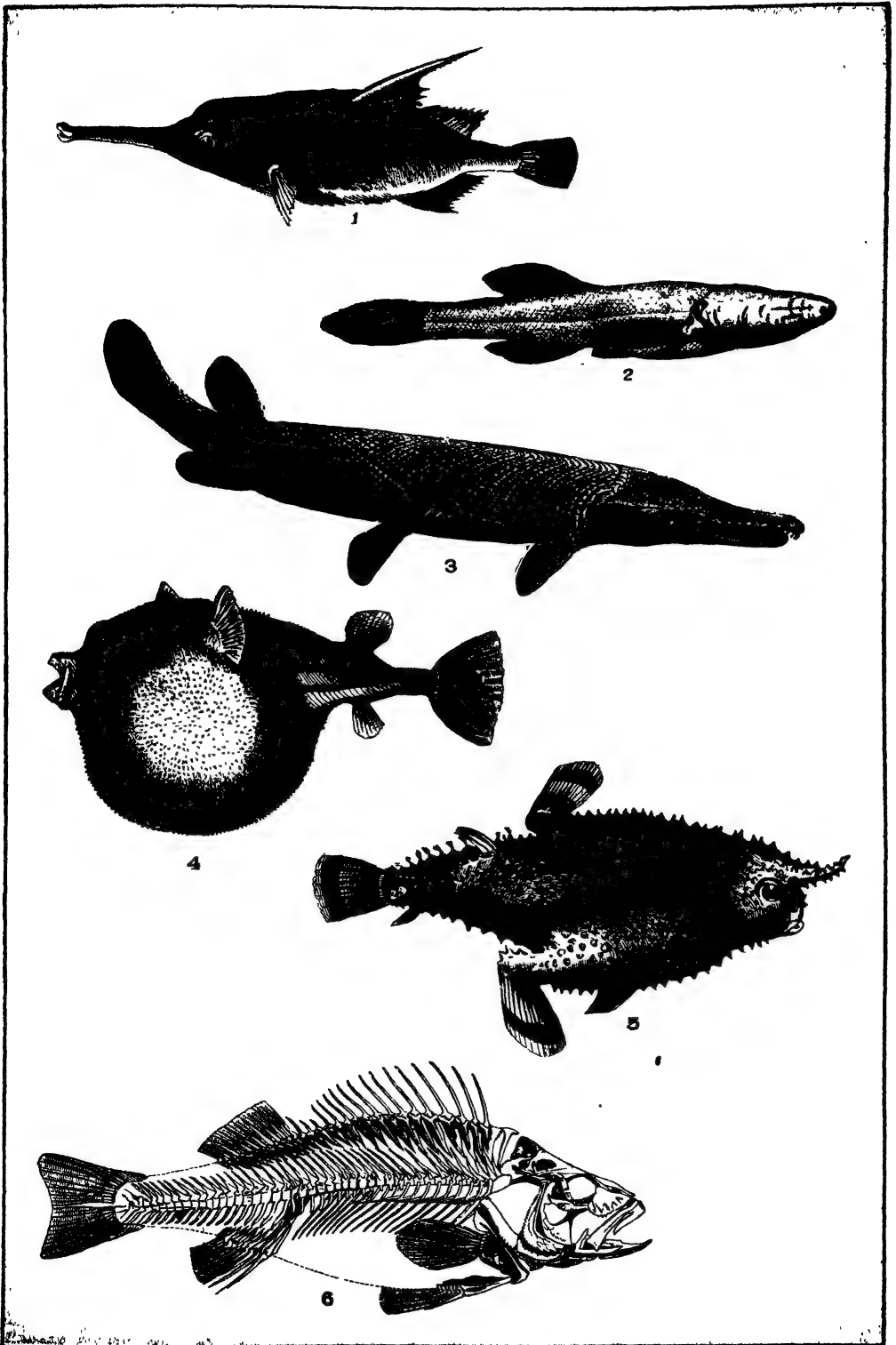
Another species deserving mention is the "rock-bass," one of the sunfish (*Ambloplites rupestris*), found in practically every lake, pond, and stream east of the dry plains. It does not usually attain more than half a pound in weight, is easily caught, and is the least persistent fighter of any of the family. In color it most nearly approaches the black bass, being mottled-olive or brassy-green.

Consult: Henshall, 'Book of the Bass' (1889); and Jordan and Evermann, 'American Food and Game Fishes' (New York 1902)

Bass, bäs (It *basso*, deep, low), the lowest part in the harmony of a musical composition. It is the most important of all the parts, the foundation of the harmony, and the support of the whole composition. Different forms of bass are. *Basso concertante*, or *Basso recitante*, the bass of the little chorus; the bass which accompanies the softer parts of a composition, as well as those which employ the whole power of the band. This part is generally taken by the violoncellos. *Bass-counter* or *contra-bass*, the under bass; that part which, when there are two basses in a composition, is performed by the double basses, the violoncellos taking the upper bass or *basso concertante*. *Basso ripieno* (Ital.), the bass of the grand chorus; that bass which joins in the full parts of a composition, and, by its depth of tone and energy of stroke, affords a powerful contrast to the lighter and softer passages or movements. *Figured bass*, a bass which, while a certain chord or harmony is continued by the parts above, moves in notes of the same harmony. *Fundamental bass*, that bass which forms the tone or natural foundation of the harmony, and from which that harmony is derived. *Ground bass*, a bass which starts with some subject of its own, and continues to be repeated throughout the movement, while the upper part or parts pursue a separate air and supply the harmony. *Thorough bass*. (See THOROUGH-BASS) *Bass clef*, the character put at the beginning of the stave, in which the bass or lower notes of the composition are placed, and serving to determine the pitch and names of those notes.

Bass (bäs) Rock, a remarkable trap-rock island, at the mouth of the Firth of Forth, three miles from North Berwick. It is of circular shape, about a mile in circumference, and rises precipitously to a height of 420 feet. It is inac-

BASS, BAT FISH, BALLOON FISH, ETC.



1. Bellows Fish (*Centriscus scolopax*).
2. Cave Fish (*Amblyopsis spelaeus*)

4. Balloon Fish (*Tetrodon fahaka*).
5. Bat Fish (*Malthe vespertilio*)

BASS STRAIT — BASSET

cessible except on one flat shelving point on the southeast. Its summit is estimated at about seven acres, and this supports a few sheep, the mutton of which is considered a great delicacy. Solan geese and other sea-fowl in myriads cover its rocks, and fly around it in clouds. The surrounding water is of great depth on the northeast, but shallow on the south. Among the historical ruins on the island are the remains of a fortalice commanding the landing-place, capable of accommodating upward of 100 men, formerly accessible only by ladders or buckets and chains; and the ruins of a chapel about halfway up the acclivity. The Bass was purchased by the English government in 1671, and its castle, long since demolished, was converted into a state prison in which several eminent Covenanters were confined. It was the last place in Britain that held out against William III., its small band of gallant defenders yielding only to starvation. The island anciently belonged to a family of the name of Lauder, whose head was styled Lauder of the Bass.

Bass (bās) **Strait**, a channel beset with islands, which separates Australia from Tasmania, 120 miles broad, discovered by George Bass, a surgeon in the British navy, in 1798.

Bass (bās) **Viol**, a stringed instrument resembling the violin in form, but much larger. It has four strings and eight stops, which are subdivided into semi-stops, and is played with a bow. See **Viol**.

Bas'sa, Africa, a district on the west coast forming part of the negro state of Liberia (q.v.).

Bassanio, ba-sa'ně-ō, the lover of Portia in Shakespeare's 'Merchant of Venice.'

Bassano, bās-sa'nō, **Hugues Bernard Maret, Duc de**, French publicist and statesman: b. Dijon, 1763; d. 1839. On the first outburst of the French Revolution he enthusiastically embraced its principles, published the *Bulletin de l'Assemblée*, and soon after was appointed editor of the *Monteur*. He became acquainted with Bonaparte, and was made by him chief of division in the ministry of foreign affairs. In 1811 he was created Duke of Bassano and appointed minister of foreign affairs; and in 1812 he conducted and signed the treaties between France, Austria, and Prussia, preparatory to the fatal expedition to Russia. When the emperor was sent to Elba in 1814, Bassano retired from public life; but immediately after Napoleon's return he joined him, and was very nearly taken prisoner at Waterloo. On the emperor's final overthrow Bassano was banished from France, but at the Revolution of July 1830 he was recalled and restored to all his honors. In 1838 he was made minister of the interior and president of the council, but the ministry of which he formed a part survived only three days.

Bassano, Jacopo, (real name GIACOMO DA PONTE), Italian painter: b. Bassano (whence his surname), 1510; d. 1592. He painted historical pieces, landscapes, flowers, and portraits; among the latter those of the Doge of Venice, of Ariosto, Tasso, and other persons of eminence. Several of his best works are in the churches of Bassano, Venice, Vicenza, and other towns of Italy. He left four sons, all painters, of whom Francesco was the most distinguished.

Bassano, Italy, a city in the province of Vicenza, on the Brenta (lon. 11° 43' E.; lat. 45° 46' N.). Its 30 churches contain beautiful paintings. A stone bridge, 182 feet long, unites the town with the large village Vincantino. Vines and olives are cultivated in the vicinity and there is considerable trade in silk, cloth, and leather. Its principal manufactures are straw hats, porcelain, and wax. Napoleon made Bassano a duchy, with 50,000 francs yearly income, and granted it to his minister of foreign affairs, Maret (see **BASSANO, HUGUES**). Near Bassano, 8 Sept. 1796, Bonaparte defeated the Austrian general Wurmser. Bassano was the birthplace of the famous printer Mauritius, as well as of the historical painter Giacomo da Ponte (see **BASSANO, JACOPO**), and a short distance away lies the village of Possagus, the birthplace of Canova. Pop. (1902) 15,443.

Bassein, bās-sān', India, a decayed town in the presidency of Bombay, at the south end of a small island of the same name, 28 miles north of Bombay, and separated from the Island of Salsette by a narrow channel. It was fortified by the Portuguese in 1536, and remained in their possession until captured by the Mahrattas in 1739. During this period it rose to be a fine and wealthy city of over 60,000 inhabitants, with many stately buildings, including a cathedral, 5 convents, 13 churches, and handsome private residences. Pop. (1901) about 11,000.

Bassein, Burma, a town in the Irrawaddy division on the left bank of the Bassein River, one of the mouths of the Irrawaddy, with a suburb on the right bank; lat. 16° 46' N, lon 94° 48' E. The English fort with the court-houses, treasury, police-office, etc., are on the left bank. In the suburb on the right bank are the rice-mills and store-yards of the principal merchants. The river is navigable up to the town for ships of the largest burden, and Bassein is now a place of considerable trade, exporting large quantities of rice, and importing coal, salt, cottons, etc. It is the seat of a consul of the United States. Pop. about 30,000.

Basselin, bas-lān, or **Bachelin**, bāsh-lān, **Oliver**, French poet b. Val-de-Vire, Normandy, about 1350; d. about 1419. It has been asserted that the vocabulary of theatrical and poetical literature is indebted to him for the word "vaudeville." He seems to have been a cloth-fuller or presser, much given to versified narration and iteration of convivial themes in rhymed fragments dubbed *vaux-de-vire* in honor of the poet's birthplace. In the 'Book of New Songs and Vaux-de-Vire' (1610) appears a collection of these bacchanalian stanzas, the most touching of which is addressed by the singer 'To My Nose,' the rubescence thereof being tastefully and exquisitely celebrated.

Basses-Alpes, bās-ālp ("lower Alps"), a department of France, on the Italian border. See **ALPS**.

Basses-Pyrénées, bās-pē-rā-nā ("lower Pyrenees"), a French department bordering on Spain and the Bay of Biscay. See **PYRENEES**.

Basset, a game of cards, formerly much played, especially in France. It is very similar to the modern faro. Severe edicts were issued against it by Louis XIV., and it was afterward played under the name of *pour et contre*. De

BASSET-HORN — BASSIA

Moirve, in his 'Doctrine of Chances,' has calculated many problems connected with this game.

Basset-horn, a wooden wind-instrument (called also CORNET by reason of its curvature), believed to have been invented in Passau in 1770. It was afterward perfected by Theodore Lotz in Presburg. It is, properly considered, an enlarged clarinet; and, notwithstanding the difference of its form, it resembles that, not only in its qualities and tone, but also as regards its intonation, the mode of holding it, and fingering; so that every clarinet player can perform on it. Besides the mouthpiece it is formed of five pieces—the head-piece, two middle pieces, the trunk, and the bell, the last of which is usually of brass. It differs from the clarinet chiefly in having four additional low keys worked by the thumb of the right hand. Its compass is three and a half octaves, from lower F in the bass to double C of the treble. It is seldom used in the orchestra; though it is found in Mozart's 'Requiem' and some other pieces. It may also be used as a bass instrument.

Basset-hound, a dog with many hound-like characteristics, somewhat used for rabbit-hunting, clumsy in shape, and allied to the dachshund (q.v.). Its head is as massive and solemn-looking as that of a bloodhound, which it also resembles in the length of its ears. Its body is as bulky as that of a foxhound, to which it is also similar as regards color, hair and form, save that its fore legs are but four inches high and crooked at the knee. Below this point is a wrinkled ankle terminating in a massive paw, each toe of which stands out distinctly. Its coat is short, smooth, and fine, with the gloss of a thoroughbred race-horse; and its colors are black and white and tan. In weight it varies from 40 to 45 pounds. It is probably of French origin.

Basseterre, bās-tār, the name of two towns in the West Indies. (1) The capital of the Island of St. Christopher's, a seaport situated at the mouth of a small river, on the south side of the island, and on the edge of the fertile vale of Bas-seterre, a tract yielding rich crops of sugar and fruits. The town was destroyed by fire in 1867, but has been rebuilt with better houses and wider streets than before. It is a place of considerable commercial importance, with a population of about 8,000. (2) The capital of the Island of Guadaloupe, situated near the south end of the island, and consisting of one principal long street stretching along the seashore. It is defended by forts Royal and Matilda. The anchorage is unsheltered and exposed to a constant swell. Pop. about 10,500.

Bas'sett, James, American missionary. b. Hamilton, Canada, 31 Jan. 1834. He was graduated at Wabash College 1856, and at Lane Theological Seminary 1859; was chaplain in the Union army 1862-3; and later pastor of Presbyterian churches in Newark and Englewood, N. J. In 1871 he went to Persia as a missionary, and in a short time acquired such a familiarity with the language that he composed a volume of hymns in Persian ('Teheran,' 1875; 1884). Other of his writings are: 'Among the Turcomans' (contributed to the 'Leisure Hour,' 1879-80); 'Note on the Simnuni Dialects' ('Journal of the Royal Asiatic Society,' 1884);

'Persia, the Land of the Imams' (N. Y. 1886). He has also translated the Gospel of St. Matthew into Gaghatti Tartar (London 1880).

Bassett, John Spencer, American historian: b. Tarboro, N. C., 10 Sept. 1867. He was graduated at Trinity College, Durham, N. C., in 1888, and took Ph.D. at Johns Hopkins in 1894. His works include 'Constitutional Beginnings in North Carolina'; 'Slavery and Servitude in the Colony of North Carolina'; 'Anti-Slavery Leaders of North Carolina'; 'Slavery in the State of North Carolina'; 'The War of the Regulation,' etc. In 1900 he was professor of history in Trinity College, N. C.

Bassford, William Kipp, American musician: b. New York, 23 April 1839. He has composed many songs and pianoforte numbers: as, Mass in E flat (1894), and a two-act opera, 'Casilda,' still in manuscript. He completed the opera 'Estrella,' left unfinished by the composer, William Vincent Wallace, at his death.

Bassi, bas'sē, Laura Maria Caterina, Italian philosopher: b. Bologna, 29 Oct. 1711; d. 20 Feb. 1778. She received a doctor's degree as an acknowledgment of her attainments, and delivered public lectures on experimental philosophy. She also lectured in the Philosophical College, where she was appointed professor. Her correspondence with the most eminent scholars of Europe was very extensive. She married Giuseppe Verratti in 1738 and had several children.

Bassi, bas'sē, Ugo, Barnabite monk, and distinguished Italian patriot: b. Cento, in the Roman states 1804, of an Italian father and Greek mother. He was much distinguished among the brethren for his extraordinary learning and talents. The liberality of his political opinions, however, rendered him obnoxious to the papal court, and he was sent into exile in Sicily, from which he returned on the accession of Pius IX. in 1846. On the breaking out of the Lombard revolution in 1848 he greatly distinguished himself by his valor in battle and his untiring services in the hospitals. On the capitulation of Treviso he went to Venice, where he fought in the ranks against her Austrian besiegers. Thence he went to Rome and joined Garibaldi's legion as chaplain. On the fall of Rome he was one of those who followed Garibaldi when he made a last attempt to fight his way to Venice, which still held out against the Austrians. The little band was, however, dispersed and cut up by Austrian troops, and Garibaldi himself escaped with great difficulty. Bassi was taken prisoner, carried to Bologna, and condemned to death 18 Aug. 1849. He was the author of a work on 'The Church After the Image of Christ,' and an unfinished poem called 'Constantine, or the Triumph of the Cross.' His talents were universal. He was an accomplished musician and composer, wrote his own language in remarkable perfection, and was a perfect master of Greek, Latin, English, and French. He was equally remarkable for his personal beauty and his eloquence as an *improvisatore*, while his memory was so prodigious that he is said to have been capable of reciting the whole of Dante's 'Divina Commedia.'

Bassia, a genus of tropical trees found in the East Indies and Africa, of the natural order Sapotaceæ. One species (*B. parkii*) is supposed to be the shea-tree of Park, the fruit of which

BASSOMPIERRE — BAST

yields a kind of butter that is highly valued and forms an important article of commerce in the interior of Africa. There are several other species, of which *B. longifolia*, or Indian oil-tree, and *B. butyracea*, or Indian butter-tree, are well known examples, yielding a large quantity of oleaginous or butyraceous matter. The wood is as hard and incorruptible as teak. See also BUTTER-TREE.

Bassompierre, bā-sōn-pē-ār, François (fran-swar) de, marshal of France, one of the most distinguished men of the courts of Henry IV. and Louis XIII., descended from a branch of the house of Clèves. b. Lorraine, 1579; d. 1646. In his youth he studied philosophy, jurisprudence, medicine, and the military art. After traveling through Italy he appeared at the court of Henry IV., where his taste for splendor, play, and gallantry soon made him conspicuous. In 1600 he made his first campaign against the Duke of Savoy, and fought with equal distinction in the following year against the Turks. His love of France soon called him back; he aspired to the hand of the daughter of the Constable de Montmorency, whose charms had excited the most violent passion in Henry IV. Bassompierre yielded to the solicitations of his king and renounced his intended union with her. In 1622 Louis XIII. appointed him marshal of France, and became so much attached to him that Luynes, the declared favorite, alarmed at his growing influence, insisted upon his removal from court. Bassompierre therefore accepted an embassy, and held this position successively in Spain, Switzerland, and England. After his return he entered again into the military service and was present at the siege of Rochelle and Montauban. Cardinal Richelieu, who soon after obtained entire control of the king and the country, feared the boldness of Bassompierre and his secret connection with the house of Lorraine; and the machinations of the latter served him as a pretext for sending Bassompierre, in 1631, to the Bastille, from which he was not released till 1643, after the death of the cardinal. During his detention he occupied himself with his memoirs (first published at Cologne, 1665), and the history of his embassies in Spain, Switzerland, and England, which sheds much light on the events of that time.

Bassoon, a wooden reed instrument which forms the natural bass to the oboe, serving as a continuation of its scale downward. The reed is fixed to a crooked mouthpiece issuing from the side of the bassoon. The holes are partly closed by the fingers, partly by means of keys. It was formerly used as an accompaniment to the oboe, but it is now so far improved with keys as to be susceptible of being played solo. Its compass is more than three octaves, from low B flat to A flat in the treble; but its scale is complicated, and much depends upon the player and even upon the individual instrument. It consists of four tubes (besides the mouthpiece), bound together somewhat like a fagot. Hence the Italians term it *fagotto*, and from them the Germans *fagott*. It forms, when put together, a continuous tube about eight feet long, but as the bore is bent abruptly back on itself its height is only about four feet. In music designed for wind-instruments it often forms the bass. It is capable of very

fine effects, and has been much employed by some of the best composers, sometimes as a tenor or even alto instrument.

Bassora, bās-sō'ra, or **Basrah**, bās'rā, Turkey, a city situated between two and three miles on the west side of and on a navigable canal leading from the Shat-el-Arab, as the united stream of the Tigris and Euphrates is called, about half way between the Persian Gulf and the junction of the two rivers. The Shat-el-Arab is navigable for vessels of 500 tons to Bassora, 70 miles. Merchants from Arabia, Turkey, Armenia, and Greece, also Jews and Indians, reside here, and it is the station of a United States consul. The Arabs are more numerous than the Turks, and their language is chiefly spoken. The city is surrounded by a wall about 10 miles in circuit, 20 to 25 feet thick. The houses are generally mean, partly constructed of clay, and the bazaars are miserable edifices. A considerable trade is carried on. Mail steamers run between Bombay and Bassora, and there are also other steamers trading here. Dates form the principal export; camels and horses, galls, gum, carpets, wool, and wheat are also exported; total exports over \$5,000,000 annually. The imports are coffee, rice, spices, textiles, etc. The trade of the interior is conducted by means of caravans. The town is dirty and unhealthy; the environs are very fertile. The modern Bassora arose in the 17th century, and does not occupy the site of the older town, whose ruins lie about nine miles southwest of it. Pop. about 30,000. The vilayet of Bassora has an area of 16,482 square miles, and a population of about 200,000.

Bassora Gum, a gum brought from Bassora; supposed to be derived either from a cactus or a mesembryanthemum.

Bassorin, a kind of mucilage found in gum tragacanth (sometimes called andraganthin), which forms a jelly with water but does not dissolve in it. A clear, aqueous-looking liquid, apparently of the nature of Bassorin, exists in the large cells of the tubercular roots of some terrestrial orchids of the section *Ophryea*. It is formed of minute cells, each with its cytoblast; the whole being compactly aggregated in the interior of the parent cell.

Bassville, bās-vēl, Nicolas Jean Hugon de, French journalist and diplomatist. As editor of the *Mercure National* he attracted attention to himself and was appointed secretary to the legation at Naples in 1792. Soon after this he was despatched to Rome, where he was killed, in 1793, by the populace for attempting, under orders of the French government, to oblige all French residents to wear the tricolor cockade. The death of Bassville has furnished the subject for many compositions in both prose and verse, in French and Italian.

Basswood, the American linden, or lime-tree (q.v.).

Bast, or **Bass**, the thin layer of fibrous tissue formed by, but outside the layer of cambium (q.v.), or in popular phrase the inner bark of dicotyledonous shrubs and trees. Less frequently it occurs in the leaves and pith of dicotyledonous herbs and in the stems of certain monocotyledonous plants in which it is not easily distinguished from the wood. By extension the term is also applied to the phloem portion

BAST — BASTARD

of the vascular system (q.v.) of flowering plants and ferns. For the plant, as well as for mercantile purposes, bast is highly important, for until it becomes changed into wood, it conducts the elaborated food from the green tissue to regions of use or storage. The bast cells are disposed and developed variously in different plants; occurring in rows, wreaths, more or less spread bundles, or single within the parenchyma. In some plants bast is formed but once, in others every year. Some fibres are simple, others branched; some primary, others secondary; some ever limber, and some change to wood. They are most developed toward the outside of the stem. While young they contain a granular liquid, which disappears by the thickening of their walls. Young bast cells when treated by a solution of iodine and chloride of zinc, become pale blue, the older ones violet, the full-grown pink. Thickened cells are plainly stratified, and their walls often become contiguous by the disappearance of the cavity. The walls exhibit various designs, spiral or other lines, more or less constantly, according to the species of the plant. By microscopical examination and chemical analysis the nature of the various fabrics made of bast may be determined. Thomson and F. Baur have thus demonstrated the sheets around Egyptian mummies to be of linen. The degree of contraction, of twisting, the length, density, and form of the single cells of the bast vary in different plants. They are very long in flax, hemp, in some nettles, sparges, etc., very short in cinchona. Cotton consists of long hairs, and not of bast cells, which it very much resembles otherwise. The bast cells of monocotyledonous plants are mostly lignified. They conduct elaborated food but a short time, become filled with air, and thus dead to the plant. The unlignified are very hygroscopic and often contain chlorophyll. No bast cell has pits, but the coniferæ have sieve pores or canals. The uses of bast are manifold. Flax bast is soft, flexible, seldom with swellings; hemp bast is very long, stiffer and thicker than flax, more stratified; nettle (*Urtica dioica*) bast resembles cotton, has swellings and is thicker than hemp. Branched and lignified bast cells of great beauty are found in the mangrove tree (*Rhizophora mangle*) and the secondary ones of *Abies pectinata*. Among the monocotyledonous bast fibres, those of the New Zealand flax (*Phormium tenax*) are the most remarkable, being formed in bundles near the margin of leaves. They resemble hemp, are very white, sometimes yellowish, very long, and contain much lignin, in consequence of which they are somewhat stiff, but very tough and fit for stout ropes. In palms a highly developed body of lignified bast surrounds the vascular bundles, while bast bundles are found also in the bark, leaves, and interior of the stem. A similar disposition exists in the *Dracaena reflexa*, and in some *Aroideæ*. Everybody knows the tenacity of the bast of the lime tree, which is hence called basswood. The Chinese grass-cloth is made of *Boehmeria nivea* or *B. tenacissima*. Manila hemp comes from *Musa textilis*; rice bags are made in East India from *Antiaris toxicaria*. From the use of bast in ancient times for writing upon, the Latin name of bast, *liber*, has been applied to designate book. See also FIBRE; FLAX; HEMP; JUTE; RAMIE.

Bast, in Egyptian mythology, a goddess represented with the head of a cat or lioness. Bubastis, in Egypt, was the city where she held a high place, similar to that of Neith in Sais. Nearly a million Egyptians made annual pilgrimages to her shrine. Great numbers of bronze images of Bast were purchased in Bubastis.

Bastable, C. F., Irish political economist: b. Charleville, County Cork, Ireland, 1855, and since 1882 a professor of political economy in Dublin University. He is the author of 'An Examination of Some Objections to the Study of Political Economy' (1884); 'The Commerce of Nations' (1892); 'Public Finance' (1895); 'The Theory of International Trade' (1897).

Bastar, a feudatory state of British India, joined with the Chanda district of the Central Provinces. It has an area of 13,062 square miles. Pop. (1891) 310,884.

Bastard, one begotten and born out of lawful wedlock, or born during wedlock where the husband was under the age of puberty, or where the husband had died at such a time that there was no possibility of his being the father, or where there was no possibility of access on the part of the husband on account of his absence from the country, or where the husband labored under a disability due to some natural infirmity.

The Romans distinguished two kinds of natural children—*nothi*, the issue of concubinage, and *spuri*, the children of prostitutes; the former could inherit from the mother, and were entitled to support from the father; the latter had no claims whatever to support. Both were often raised to all the rights of legitimate children by affiliation. The Athenians treated all bastards with extreme rigor. By the laws of Solon, they were denied the rights of citizenship, and a law of Pericles ordered the sale of 5,000 bastards as slaves. What rendered these regulations more severe was, that not only the issue of concubinage and adultery, but all children whose parents were not both Athenians, were considered bastards at Athens. Thus Themistocles, whose mother was a native of Halicarnassus, was deemed a bastard. The law, as might be expected, was often set aside by the influence of powerful citizens. Pericles himself had it repealed in favor of his son by Aspasia, after he had lost his legitimate children by the plague. The condition of bastards has been different in different periods of modern history. Among the Goths and Franks, they were permitted to inherit from the father. Thierry, the natural son of Clovis, inherited a share of his father's conquests. William the Conqueror, natural son of Robert I., Duke of Normandy, and of Arlette, daughter of a furrier of Falaise, inherited his father's dominions. He called himself *Willelmus, cognomento Batardus*. The celebrated Dunois styled himself, in his letters, the Bastard of Orleans. In Spain, bastards have always been capable of inheriting. The bastardy of Henry of Transtamare did not prevent his accession to the throne of Castile. In France, the condition of bastards was formerly very different in the different provinces. Since the Revolution, it has been regulated in a uniform manner by the general law of the kingdom. The *code civil* thus fixes their rights: If the father or mother leave legitimate descendants, the bastard is entitled to one third of the portion he would

BASTARD BAR—BASTIAT

have inherited had he been a lawful child; if the father or mother die without descendants, but leave ascendants, or brothers or sisters, he is then entitled to one half of such a portion; if the father or mother leave no ascendants nor descendants, nor brothers nor sisters, he is entitled to three quarters of such a portion; and if the father or mother leave no relations within the degrees of succession, he is entitled to the whole property. These regulations do not apply to the issue of an incestuous or adulterous connection.

By the common law of England, a child born after marriage, however soon, is legitimate, or at least he is presumed to be so; for one born in wedlock, and long enough after the marriage to admit of the period of gestation, may still be proved illegitimate, under some circumstances, and this is the general rule in the United States. According to the common law, a bastard is not the heir of any one, and, on the other hand, his only heirs are his children born in wedlock, and their descendants. According to the Roman law, one born out of wedlock might be legitimated by subsequent marriage and acknowledgment of his parents. In 1236 the English prelates proposed the introduction of the Roman law, in this respect, into England, to which the nobility made the celebrated reply, *Nolumus leges Angliæ mutare* (We are unwilling to change the laws of England). See Schouler, 'Treatise on the Law of Domestic Relations.'

Bastard Bar, the ordinary name given to the heraldic mark used to indicate illegitimate descent. Properly speaking, it is not a bar at all, which is a band stretching horizontally across the shield, but a baton sinister, that is, it stretches diagonally across the shield in the direction of the sinister chief and the dexter base, but is couped or cut short at the ends, so as not to touch the corners of the shield. This circumstance serves to distinguish the bastard bar from the bend sinister, as well as the fact that the former is only one fourth of the breadth of the latter. When belonging to the illegitimate descendants of royalty it may be of metal; but in other cases it must be of color, even when on another color. This mark in heraldry is of comparatively recent origin, bastards in earlier times, not having been allowed to bear the arms of their fathers. It cannot be removed until three generations have borne it, and not even then unless replaced by some other mark assigned by the king of arms, or unless the coat is changed. Sometimes permission was granted to a bastard or one of his descendants to bear it dexter instead of sinister, although he was not allowed to cancel it altogether.

Bastard of Orleans, the name given to the natural son of Louis, brother of Charles VI. of France, Jean Dunois b. 1402; d. 1468. On account of his exploits in the Hundred Years' war he was created Count of Orleans.

Bastarnæ, the earliest Teutonic people mentioned in history. They migrated from the region of the Vistula to the Lower Danube about 200 B.C. See Keane, 'Man: Past and Present' (1899).

Bastia, the former capital of the island of Corsica, 08 miles northeast of Ajaccio by rail. It is badly built, has narrow streets, a strong

citadel near the sea, and a spacious but not very well sheltered harbor. The inhabitants carry on a considerable trade in manufactured goods, hides, wine, oil, wax candles, liquors, and macaroni. The stilettoes manufactured here are held in great esteem by the Italians. In 1745 Bastia was taken by the British, and in 1768 was united with France. On the new division of the French territories (1791) Bastia was made the capital of the department of Corsica, of which at present Ajaccio is the capital. Bastia is still, however, the commercial and industrial capital of the island and a United States consul is stationed here. Pop. (1900) 22,522.

Bastian, Adolf, German traveler and anthropologist b. Bremen, 26 June 1826. He has made extended journeys throughout Australia, Asia, America, and West Africa at various periods of his career, and his explorations have been prosecuted in such widely sundered countries as Yucatan, New Zealand, and Persia. At the age of 70 he started on an exploring voyage to the Malay Archipelago. He has been professor of ethnology in the University of Berlin, director of the Museum für Völkerkunde, and in 1901 became editor of the 'Ethnographisches Notizblatt,' published in Berlin. His nearly 60 works deal with the various aspects of anthropology, his range being broad and his services in behalf of science of the greatest value. Among his many volumes may be named 'Der Mensch in der Geschichte' (1860); 'Ethnographische Forschungen' (1871-3); 'Der Buddhismus in seiner Psychologie' (1882); 'Der Fetisch an der Küste Guineas' (1884); 'Vorgeschichtliche Schopfungslieder' (1893); 'Die Nikonesischen Kolonien' (1899-1900); 'Die Völkerkunde und der Völkerverkehr' (1900).

Bastian, Henry Charlton, English physician and biologist b. Truro, 26 April 1837. He obtained the degree of M.A. in 1861 from the University of London, graduating subsequently in medicine at the same university. In 1864-6 he was a medical officer in Broadmoor Criminal Lunatic Asylum, and in the latter year was appointed lecturer on pathology and assistant physician in St. Mary's Hospital. In 1867 he became professor of pathological anatomy in University College, and in 1878 he was also appointed professor of clinical medicine. In 1887-95 he was professor of the principles and practice of medicine. Apart from numerous contributions to medical and other periodicals, and to Quain's 'Dictionary of Medicine,' his works include 'The Modes of Origin of Lowest Organisms' (1871); 'The Beginnings of Life' (1872); 'Evolution and the Origin of Life' (1874); 'Lectures on Paralysis from Brain Disease' (1875); 'The Brain as an Organ of Mind' (1880), which has been translated into French and German; 'Paralysis: Cerebral, Bulbar, and Spinal' (1886); 'A Treatise on Aphasia and other Speech Defects' (1898). He is a recognized authority in the pathology of the nervous system and an advocate of the doctrine of spontaneous generation.

Bastiat, Frédéric, a distinguished French political economist: b. Bayonne, 19 June 1801; d. Rome, 24 Dec. 1850. He entered in 1818 the counting-house of his uncle at Bayonne, but he

BAST — BASTARD

of the vascular system (q.v.) of flowering plants and ferns. For the plant, as well as for mercantile purposes, bast is highly important, for until it becomes changed into wood, it conducts the elaborated food from the green tissue to regions of use or storage. The bast cells are disposed and developed variously in different plants; occurring in rows, wreaths, more or less spread bundles, or single within the parenchyma. In some plants bast is formed but once, in others every year. Some fibres are simple, others branched; some primary, others secondary; some ever limber, and some change to wood. They are most developed toward the outside of the stem. While young they contain a granular liquid, which disappears by the thickening of their walls. Young bast cells when treated by a solution of iodine and chloride of zinc, become pale blue, the older ones violet, the full-grown pink. Thickened cells are plainly stratified, and their walls often become contiguous by the disappearance of the cavity. The walls exhibit various designs, spiral or other lines, more or less constantly, according to the species of the plant. By microscopical examination and chemical analysis the nature of the various fabrics made of bast may be determined. Thomson and F. Baur have thus demonstrated the sheets around Egyptian mummies to be of linen. The degree of contraction, of twisting, the length, density, and form of the single cells of the bast vary in different plants. They are very long in flax, hemp, in some nettles, sparges, etc., very short in cinchona. Cotton consists of long hairs, and not of bast cells, which it very much resembles otherwise. The bast cells of monocotyledonous plants are mostly lignified. They conduct elaborated food but a short time, become filled with air, and thus dead to the plant. The unlignified are very hygroscopic and often contain chlorophyll. No bast cell has pits, but the coniferæ have sieve pores or canals. The uses of bast are manifold. Flax bast is soft, flexible, seldom with swellings; hemp bast is very long, stiffer and thicker than flax, more stratified; nettle (*Urtica dioica*) bast resembles cotton, has swellings and is thicker than hemp. Branched and lignified bast cells of great beauty are found in the mangrove tree (*Rhizophora mangle*) and the secondary ones of *Abies pectinata*. Among the monocotyledonous bast fibres, those of the New Zealand flax (*Phormium tenax*) are the most remarkable, being formed in bundles near the margin of leaves. They resemble hemp, are very white, sometimes yellowish, very long, and contain much lignin, in consequence of which they are somewhat stiff, but very tough and fit for stout ropes. In palms a highly developed body of lignified bast surrounds the vascular bundles, while bast bundles are found also in the bark, leaves, and interior of the stem. A similar disposition exists in the *Dracaena reflexa*, and in some *Aroideæ*. Everybody knows the tenacity of the bast of the lime tree, which is hence called basswood. The Chinese grass-cloth is made of *Boehmeria nivea* or *B. tenacissima*. Manila hemp comes from *Musa textilis*; rice bags are made in East India from *Antiaris toxicaria*. From the use of bast in ancient times for writing upon, the Latin name of bast, *liber*, has been applied to designate book. See also FIBRE; FLAX; HEMP; JUTE; RAMIE.

Bast, in Egyptian mythology, a goddess represented with the head of a cat or lioness. Bubastis, in Egypt, was the city where she held a high place, similar to that of Neith in Sais. Nearly a million Egyptians made annual pilgrimages to her shrine. Great numbers of bronze images of Bast were purchased in Bubastis.

Bastable, C. F., Irish political economist: b. Charleville, County Cork, Ireland, 1855, and since 1882 a professor of political economy in Dublin University. He is the author of 'An Examination of Some Objections to the Study of Political Economy' (1884); 'The Commerce of Nations' (1892); 'Public Finance' (1895); 'The Theory of International Trade' (1897).

Bastar, a feudatory state of British India, joined with the Chanda district of the Central Provinces. It has an area of 13,062 square miles. Pop. (1891) 310,884.

Bastard, one begotten and born out of lawful wedlock, or born during wedlock where the husband was under the age of puberty, or where the husband had died at such a time that there was no possibility of his being the father, or where there was no possibility of access on the part of the husband on account of his absence from the country, or where the husband labored under a disability due to some natural infirmity.

The Romans distinguished two kinds of natural children—*nothi*, the issue of concubinage, and *spuri*, the children of prostitutes; the former could inherit from the mother, and were entitled to support from the father; the latter had no claims whatever to support. Both were often raised to all the rights of legitimate children by affiliation. The Athenians treated all bastards with extreme rigor. By the laws of Solon, they were denied the rights of citizenship, and a law of Pericles ordered the sale of 5,000 bastards as slaves. What rendered these regulations more severe was, that not only the issue of concubinage and adultery, but all children whose parents were not both Athenians, were considered bastards at Athens. Thus Themistocles, whose mother was a native of Halicarnassus, was deemed a bastard. The law, as might be expected, was often set aside by the influence of powerful citizens. Pericles himself had it repealed in favor of his son by Aspasia, after he had lost his legitimate children by the plague. The condition of bastards has been different in different periods of modern history. Among the Goths and Franks, they were permitted to inherit from the father. Thierry, the natural son of Clovis, inherited a share of his father's conquests. William the Conqueror, natural son of Robert I., Duke of Normandy, and of Arlette, daughter of a furrier of Falaise, inherited his father's dominions. He called himself *Willelmus, cognomento Batardus*. The celebrated Dunois styled himself, in his letters, the Bastard of Orleans. In Spain, bastards have always been capable of inheriting. The bastardy of Henry of Transtamare did not prevent his accession to the throne of Castile. In France, the condition of bastards was formerly very different in the different provinces. Since the Revolution, it has been regulated in a uniform manner by the general law of the kingdom. The *code civil* thus fixes their rights: If the father or mother leave legitimate descendants, the bastard is entitled to one third of the portion he would

BASTARD BAR—BASTIAT

have inherited had he been a lawful child; if the father or mother die without descendants, but leave ascendants, or brothers or sisters, he is then entitled to one half of such a portion; if the father or mother leave no ascendants nor descendants, nor brothers nor sisters, he is entitled to three quarters of such a portion; and if the father or mother leave no relations within the degrees of succession, he is entitled to the whole property. These regulations do not apply to the issue of an incestuous or adulterous connection.

By the common law of England, a child born after marriage, however soon, is legitimate, or at least he is presumed to be so; for one born in wedlock, and long enough after the marriage to admit of the period of gestation, may still be proved illegitimate, under some circumstances, and this is the general rule in the United States. According to the common law, a bastard is not the heir of any one, and, on the other hand, his only heirs are his children born in wedlock, and their descendants. According to the Roman law, one born out of wedlock might be legitimated by subsequent marriage and acknowledgment of his parents. In 1236 the English prelates proposed the introduction of the Roman law, in this respect, into England, to which the nobility made the celebrated reply, *Nolumus leges Angliæ mutare* (We are unwilling to change the laws of England). See Schouler, 'Treatise on the Law of Domestic Relations.'

Bastard Bar, the ordinary name given to the heraldic mark used to indicate illegitimate descent. Properly speaking, it is not a bar at all, which is a band stretching horizontally across the shield, but a baton sinister; that is, it stretches diagonally across the shield in the direction of the sinister chief and the dexter base, but is coupé or cut short at the ends, so as not to touch the corners of the shield. This circumstance serves to distinguish the bastard bar from the bend sinister, as well as the fact that the former is only one fourth of the breadth of the latter. When belonging to the illegitimate descendants of royalty it may be of metal; but in other cases it must be of color, even when on another color. This mark in heraldry is of comparatively recent origin, bastards in earlier times, not having been allowed to bear the arms of their fathers. It cannot be removed until three generations have borne it, and not even then unless replaced by some other mark assigned by the king of arms, or unless the coat is changed. Sometimes permission was granted to a bastard or one of his descendants to bear it dexter instead of sinister, although he was not allowed to cancel it altogether.

Bastard of Orleans, the name given to the natural son of Louis, brother of Charles VI. of France, Jean Dunois b. 1402; d. 1468. On account of his exploits in the Hundred Years' war he was created Count of Orleans.

Bastarnæ, the earliest Teutonic people mentioned in history. They migrated from the region of the Vistula to the Lower Danube about 200 B.C. See Keane, 'Man: Past and Present' (1899).

Bastia, the former capital of the island of Corsica, 08 miles northeast of Ajaccio by rail. It is badly built, has narrow streets, a strong

citadel near the sea, and a spacious but not very well sheltered harbor. The inhabitants carry on a considerable trade in manufactured goods, hides, wine, oil, wax candles, liquors, and macaroni. The stilettoes manufactured here are held in great esteem by the Italians. In 1745 Bastia was taken by the British, and in 1768 was united with France. On the new division of the French territories (1791) Bastia was made the capital of the department of Corsica, of which at present Ajaccio is the capital. Bastia is still, however, the commercial and industrial capital of the island and a United States consul is stationed here. Pop. (1900) 22,522.

Bastian, Adolf, German traveler and anthropologist: b. Bremen, 26 June 1826. He has made extended journeys throughout Australia, Asia, America, and West Africa at various periods of his career, and his explorations have been prosecuted in such widely sundered countries as Yucatan, New Zealand, and Persia. At the age of 70 he started on an exploring voyage to the Malay Archipelago. He has been professor of ethnology in the University of Berlin, director of the Museum für Völkerkunde, and in 1901 became editor of the 'Ethnographisches Notizblatt,' published in Berlin. His nearly 60 works deal with the various aspects of anthropology, his range being broad and his services in behalf of science of the greatest value. Among his many volumes may be named 'Der Mensch in der Geschichte' (1860); 'Ethnographische Forschungen' (1871-3); 'Der Buddhismus in seiner Psychologie' (1882); 'Der Fetisch an der Küste Guineas' (1884); 'Vorgeschichtliche Schöpfungslieder' (1893); 'Die Nikronesischen Kolonien' (1899-1900); 'Die Völkerkunde und der Völkerverkehr' (1900).

Bastian, Henry Charlton, English physician and biologist: b. Truro, 26 April 1837. He obtained the degree of M.A. in 1861 from the University of London, graduating subsequently in medicine at the same university. In 1864-6 he was a medical officer in Broadmoor Criminal Lunatic Asylum, and in the latter year was appointed lecturer on pathology and assistant physician in St. Mary's Hospital. In 1867 he became professor of pathological anatomy in University College, and in 1878 he was also appointed professor of clinical medicine. In 1887-95 he was professor of the principles and practice of medicine. Apart from numerous contributions to medical and other periodicals, and to Quain's 'Dictionary of Medicine,' his works include 'The Modes of Origin of Lowest Organisms' (1871); 'The Beginnings of Life' (1872); 'Evolution and the Origin of Life' (1874); 'Lectures on Paralysis from Brain Disease' (1875); 'The Brain as an Organ of Mind' (1880), which has been translated into French and German; 'Paralysis: Cerebral, Bulbar, and Spinal' (1886); 'A Treatise on Aphasia and other Speech Defects' (1898). He is a recognized authority in the pathology of the nervous system and an advocate of the doctrine of spontaneous generation.

Bastiat, Frédéric, a distinguished French political economist: b. Bayonne, 19 June 1801; d. Rome, 24 Dec. 1850. He entered in 1818 the counting-house of his uncle at Bayonne, but he

felt no enjoyment in the routine of mercantile life, and in 1825 retired to a property at Murgon, of which he became possessor on the death of his grandfather. Thus withdrawn from society he devoted himself with eagerness to meditation and study, mastering the English and Italian languages and literatures, speculating on the problems of philosophy and religion, and digesting the doctrines of Adam Smith and Say, of Charles Compté and Dunoyer. In 1845 he came to Paris in order to superintend the publication of his '*Cobden et la Ligue, ou l'agitation Anglaise pour la liberté des échanges*,' and was very cordially received by the economists of the capital; from Paris he went to London and Manchester, and made the personal acquaintance of Cobden, Bright, and other leaders of the league. When he returned to France he found that his writings had been exerting a powerful influence; and in 1846 he assisted in organizing at Bordeaux the first French Free Trade Association. He wrote in rapid succession a series of brilliant and effective pamphlets and essays, showing how socialism was connected with protection, and exposing the delusions on which it rested. While thus occupied he was meditating the composition of a great constructive work, meant to renovate economical science by basing it on the principle that "interests left to themselves tend to harmonious combinations, and to the progressive preponderance of the general good." The first volume of this work, '*Les Harmonies Économiques*,' was published in the beginning of 1850. The life work of Bastiat, in order to be fairly appreciated, requires to be considered in three aspects. (1) He was the advocate of free trade, the opponent of protection. The general theory of free trade had, of course, been clearly stated and solidly established before he was born, and his desire to see its principles acted on in France was quickened and confirmed by the agitation of the Anti-Corn-Law League for their realization in England, but as no one denies it to have been a great merit in Cobden to have seen so distinctly and comprehensively the bearing of economical truths which he did not discover, no one should deny it to have been also a great merit in Bastiat. He did far more than merely restate the already familiar truths of free trade. He showed as no one before him had done how they were applicable in the various spheres of French agriculture, trade, and commerce. Now the abstract theory of free trade is of comparatively little value; its elaboration so as to cover details, its concrete application, and its varied illustration are equally essential. And in these respects it owes more, perhaps, to Bastiat than to any other economist. In the '*Sophismes Économiques*' we have the completest and most effective, the wisest and the wittiest exposure of protectionism in its principles, reasonings, and consequences which exists in any language. (2) He was the opponent of socialism. In this respect also he had no equal among the economists of France. He alone fought socialism hand to hand, body to body, as it were, not caricaturing it, not denouncing it, not criticising under its name some merely abstract theory, but taking it as actually presented by its most popular representatives, considering patiently their proposals and arguments, and proving conclusively that they proceed on false principles, reasoned

badly, and sought to realize generous aims by foolish and harmful means. Nowhere will reason find a richer armory of weapons available against socialism than in the pamphlets published by Bastiat between 1848 and 1850. These pamphlets will live, it is to be hoped, at least as long as the errors which they expose. (3) He attempted to expound in an original and independent manner political economy as a science. In combating first the protectionists and afterward the socialists, there gradually rose on his mind a conception which seemed to him to shed a flood of light over the whole of economical doctrine, and, indeed, over the whole theory of society, namely, the harmony of the essential tendencies of human nature. The radical error, he became always more convinced, both of protectionism and socialism, was the assumption that human interests, if left to themselves, would inevitably prove antagonistic and anti-social, capital robbing labor, manufactures ruining agriculture, the foreigner injuring the native, the consumer the producer, etc.; and the chief weakness of the various schools of political economy, he believed he had discovered in their imperfect apprehension of the truth that human interests, when left to themselves, when not arbitrarily and forcibly interfered with, tend to harmonious combination, to the general good. Such was the point of view from which Bastiat sought to expound the whole of economical science. The sphere of that science he limited to exchange, and he drew a sharp distinction between utility and value. Political economy he defined as the theory of value, and value as "the relation of two services exchanged." The latter definition he deemed of supreme importance. It appeared to him to correct what was defective or erroneous in the conflicting definitions of value given by Adam Smith, Say, Ricardo, Senior, Storch, etc., to preserve and combine what was true in them, and to afford a basis for a more consistent and developed economical theory than had previously been presented. It has, however, found little acceptance, and Roscher, Cairnes, and others seem to have shown it to be ambiguous and misleading. A consequence of it on which he laid great stress was that the gratuitous gifts of nature, whatever be their utility, are incapable of acquiring value—what is gratuitous for man in an isolated state remaining gratuitous in a social condition. Thus, land, according to Bastiat, is as gratuitous to men at the present day as to their first parents, the rent which is paid for it,—its so-called value,—being merely the return for the labor and capital which have been expended on its improvement. In the general opinion of economists he has failed to establish this doctrine, failed to show that the properties and forces of nature cannot be so appropriated as to acquire value. His theory of rent is nearly the same as Carey's, that is, decidedly anti-Ricardian. His views on the growth of capital and interest, on landed property, competition, consumption, wages, and population, are independent, and, if not unqualifiedly true, at least richly suggestive.

Bastide, Jules, French statesman: b. Paris, 21 Nov. 1800; d. 1879. Early a democrat, he could never cease to labor for the downfall of the Bourbon monarchy, and fought hard in the revolution of July 1830. He was also opposed to the Orleans monarchy. Condemned to

death for his share in the insurrection of 5 June 1832, he escaped from prison and fled to England, where he resided two years. He returned in 1834, and was acquitted. After the death of Armand Carrel he became chief editor of the *National* newspaper. This place he resigned in 1846 and founded the *Revue Nationale* in 1847. He rendered great assistance to Lamartine in the office of the ministry of foreign affairs, and was minister for foreign affairs from 10 May to 20 Dec. 1848. He retired to private life after the *coup d'état* of 1852. He was the author of 'La république française et l'Italie en 1848' (1858); 'Guerres de religion en France' (1859).

Bastien-Lepage, bast-yen'-le-pazh, **Jules**, French painter. b. Damvilliers, 1 Nov. 1848; d. 10 Dec. 1884. He studied under Cabanel, and early began to attract notice by his impressionist pictures in the Salon. Some of his more important works were 'In Spring,' 'The First Communion,' 'The Shepherds,' 'The Potato Harvest,' 'The Wheat-field,' 'The Beggar,' and 'Joan of Arc Listening to the Voices.' His most striking portraits were those of his grandfather, his father and mother, Sarah Bernhardt, André Theuriot, and the Prince of Wales. He was made a chevalier of the Legion of Honor in 1879. See Theuriot, 'J. Bastien-Lepage, l'homme et l'artiste' (1885).

Bastile, the state prison and citadel of Paris, built to protect the palace of Charles V. against the incursions of the Burgundians, and destroyed by the mob in the beginning of the Revolution in 1789, after an existence of over four centuries. It was founded by Hugues d'Aubriot in 1369, and completed by the addition of four towers in 1383.

Lettres de cachet were issued in the name of the king, but the names of the individuals were inserted by the ministers, who were the depositaries of these letters. Of the origin of this custom we may perhaps find the explanation in Montesquieu's *Esprit des Lois*, where it is said, "Honor is the virtue of monarchies, and often supplies its place." A nobleman was unwilling to be dishonored by a member of his family. Filial disobedience and unworthy conduct were probably not more uncommon among the nobility of France than elsewhere. But in such cases fathers and relations often requested the confinement of the offender until the head of the family should express a wish for his release. At first this privilege was limited to the chief families of the country. The next step was, that the ministers of government considered themselves entitled to the same privileges as heads of families among the nobility. If an offense was committed in their offices or households, which, if known, would have cast a shadow upon the ministers themselves, they arrested, *motu proprio*, the obnoxious individuals, and often made use of their privilege to put out of sight persons whose honest discharge of duty had excited their displeasure, or who were acquainted with facts disgraceful to the ministers themselves. It sometimes happened that no further examination of the prisoners was held, and the cause of their detention nowhere recorded. In such cases an individual remained in prison sometimes 30 or 40 years, or even till his death, because succeeding officers took it for granted that he had been properly

confined, or that his imprisonment was required for reasons of state. The invention of the *lettres de cachet* immediately opened the door to the tyranny of ministers and the intrigues of favorites, who supplied themselves with these orders, in order to confine individuals who had become obnoxious to them. These arrests became continually more arbitrary, and men of the greatest merit were liable to be thrown into prison whenever they happened to displease a minister, a favorite, or a mistress. On 14 July 1789 the Bastile was surrounded by a tumultuous mob, who first attempted to negotiate with the governor Delaunay, but when these negotiations failed, began to attack the fortress. For several hours the mob continued their siege without being able to effect anything more than an entrance into the outer court of the Bastile; but at last the arrival of some of the Royal Guard with a few pieces of artillery forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the hôtel de ville was torn from his captors and put to death. The next day the destruction of the Bastile began, and a bronze column now marks its site. The event considered by itself was of no great national importance, but it marked the beginning of the French revolution.

Much exaggeration took place in relation to the discoveries said to be made in its demolition, especially those in relation to one Count de Lorges; but it is sufficiently established that there was no such person in existence, much less in the Bastile. No exaggeration, however, was needed. Seven persons only were found in its cells and dungeons; one, the Count de Solage, a prisoner since his 11th year; another, Tavernier, the son of Paris Duverney, who, after 10 years at the Isles Marguerites, had passed 30 years in the Bastile, and who reappeared on his liberation, bewildered, with a broken intellect, like a man awakened from a sleep of 40 years, to a new world compared with that on which he had closed his eyes. Records of horrors even worse than this were found inscribed on the registers of the prison. Two will suffice. They are the names of Father Theodore Fleurand, of Brandenburg, a Capuchin, retained many years on suspicion of being a spy; and of one Lebar, arrested at 76 and dead at 90 years. Nearly 50 years before Cagliostro scrawled on the walls of his cell: "The Bastile shall be demolished, and the people shall dance on the area where it stood." This prophecy, at least, of the empiric and impostor, was realized to the letter. It was the Carmagnole which they danced about the liberty trees to the tune of the 'Ça Ira.' See Arnold, 'Histoire de la Bastile' (1845-59); Bingham, 'The Bastile' (1888); Funck-Brentano, 'The Bastile' (1900).

Bastinado, a punishment employed by the Turks, which consists of blows upon the back or soles of the feet, applied with a light wooden stick or with a knotted string.

Bastion, a flanking tower in mediæval fortification, from which archers and war machines could direct their projectiles on the storming enemy while he was held in check by the ditch. On the introduction of artillery into Europe towers were made considerably larger than formerly, and ultimately, in the beginning

BASTON — BAT

of the 16th century, the Italian engineers made them polygonal instead of round or square, thus forming a bastion. This is an irregular pentagon, one side of which is turned inward toward the tower, so that the opposite salient angle faces the open field. The two longer sides, enclosing the salient angle, are called the faces; the two shorter ones, connecting them with the town wall or rampart, are called the flanks. The faces are destined to reply to the distant fire of the enemy, the flanks to protect the ditch by their fire. The first Italian bastions still showed their descent from the ancient towers. They kept close to the main walls; the salient angle was very obtuse, the faces short, and the parapet revetted with masonry to the very top. Bastions are built in very different ways. Some are entirely filled with earth; some have a void space inside; some are straight, some curved, some double, some have even three or four flanks, one over the other; some have *fausse-brayes*, or low ramparts of earth outside; sometimes they have casemates, destined for the retreat of the garrison, or for batteries; sometimes cavaliers or orillons, etc. In modern times, among the fortifications built according to the system of bastions, those on the plan of Cormontaigne and the modern French works, are considered best adapted for defense. They are spacious; the flank of the side bulwark, which is perpendicular to the prolongation of the face of the principal bulwark, is not farther distant than 300 paces from its point; it is also straight, and orillons and other artificial contrivances are banished.

Baston, Robert, English poet: b. in the 13th century near Nottingham; d. about 1320. He became prior of a Carmelite convent at Scarborough, and is said to have accompanied Edward II. into Scotland, with the view of celebrating the anticipated victories of his sovereign, but having been taken prisoner, was compelled to change his strain, and wrote in honor of Robert Bruce. Besides poetry he left several works in Latin, one entitled 'De Varnis Mundi Statibus,' and another, 'De Sacerdotum Luxuriis.'

Bastwick, John, English physician: b. Writtle in Essex, 1593; d. 1654. He settled at Colchester, but instead of confining himself to his profession entered keenly into theological controversy, and in 1624 procured the publication in Holland of a treatise which he had written, entitled 'Elenchus Religionis Papisticæ,' which, as he declares on the title-page, he proves it to be neither apostolic nor catholic, nay, not even Roman. He afterward published 'Flagellum Pontificis et Episcoporum Lati-alium,' which acquired some notoriety as a fervid attack on Episcopacy in general, and attracted the attention of the high-commission court, who called the author before them, and condemned him to a fine and two years' imprisonment. Bastwick became more zealous than before, however, and published a defense addressed to the English prelates and a new 'litany,' in which his former offenses were boldly repeated. A second sentence mercilessly condemned him to a much heavier fine, to exposure on the pillory, the loss of his ears, and imprisonment for life. The ascendancy of the Parliament in 1640 procured his freedom; the sentence was formally repealed, and the amount

of the fines imposed on him was afterward refunded. He appears to have been a staunch Presbyterian, for in 1648 we find him attacking the Independents.

Basutoland, an English crown colony of South Africa, lying to the east of the Orange River Colony, and on the northeast of Cape Colony. The Basutos belong chiefly to the great stem of the Bechuanas, out of one of the chief branches of whom, along with the survivors of various other Caffre tribes, they have arisen. Their countenance is better formed than that of the negroes, although they have the flat nose, protruding lips, and woolly hair of the latter. Their figure is slender and well-proportioned, the color of their skin a very dark brown, and their disposition cheerful, mild, and pacific. Their land, called by themselves *Lesuto*, is very fertile, and is cultivated with great industry; but its fertility has long exposed them to the encroachments of their neighbors. Under their chief Moshesh, who died in 1869, they were raised from a state of utter barbarism to a certain degree of civilization, and the land was thrown open to missionaries. Being exposed, however, to constant attacks of their warlike neighbors, Moshesh was at last induced to request the English government to adopt them as subjects. This was acceded to, and in 1868 Basutoland was declared English territory, being annexed to Cape Colony in 1871. In 1884, however, Basutoland was placed under the direct authority of the home government. It has an area of about 10,300 square miles, and the exports, which consist chiefly of grain, cattle, and wool, in 1900 amounted to \$669,320. Pop. (estimated) about 260,000. See Widdicombe, 'Fourteen Years in Basutoland' (1892); Barkley, 'Among Boers and Basutos' (1900); Bryce, 'Impressions of South Africa' (1899).

Bat, one of a group (order *Chiroptera*) of small mammals adapted to life in the air by the possession of wings formed of a membrane stretched between the greatly prolonged bones of the arm and hand. The general organization of bats allies them to the *Insectivora*. The bones of the spine, hinder limbs, and tail are of a normal character; the chest is much enlarged to admit of the increased size of the lungs and heart, necessary to the relatively violent exertion necessary to flight, the breast bone is keeled as in birds, and the muscles of the fore limbs are much enlarged. The fore limbs themselves consist of the normal number and arrangement of bones, but all are greatly elongated, especially those of the fingers, which are so lengthened out as often to be equal to the total length of the spine. The thumb, however, is comparatively small, stands at right angles to the other bones, and terminates in a strong claw of great service in clinging to supports. The whole extent of the arm and hand in the bats is inclosed within a membrane which consists of leathery skin, more or less furry upon the outside, which stretches between the fingers, arm bones and body, forming an extensible membrane, or parachute, and constituting an effective instrument of flight. In some bats a similar membrane (which is only an extension of the skin and is of double thickness) stretches from the heel of each hind foot, where it is supported by a bony spur, to the tip of the tail, but in many bats the tail is free from any such mem-

BATS.



1 Flap-nose Bat (*Rhinopoma microphyllum*)

2 Pigmy Bat (*Vesperugo pipistrellus*) (natural size)

3 Water Bat (*Vespertilio daubentonii*)

4 Horseshoe Nose Bat (*Rhinolophus ferrum-equinum*),

BAT-PARASITES

brane. The tail is very variable in length, but is never prehensile nor bushy. The hinder limbs of bats are peculiar in being twisted in such a way that the knee bends backward, making walking very difficult.

The membranous wings of the bat are not only an organ of flight, enabling it to perform feats in the air probably not exceeded by any bird or insect, but are also a means of informing the creature as to its surroundings. Bats are mainly nocturnal and their eyes, though highly organized, are very small, imbedded in fur and comparatively useless in the dark, yet no animal seems more thoroughly wide awake and able to take care of itself, even in almost complete darkness, than this one, which habitually lives in gloomy caves and seeks its food only after daylight has departed. The ability which it displays in catching its prey by extraordinary agility in pursuit, and in avoiding obstacles as it darts about among the trees, seem to be due largely to an extreme sensitiveness in the wings. These are not only supplied with a great number of blood vessels and nerves, but their surfaces abound in minute sense-organs, each the terminus of a nerve fibrilla. This armature has evidently arisen as an added means of information, giving the animal a sense of touch more exquisite than we know of elsewhere in the animal kingdom. The well-known experiments of the Italian Spallanzani toward the end of the 18th century, which have been verified by more recent investigations, make it plain that bats depend very largely upon these sense-organs in their wings to guide them in their devious flight through the darkness. It was found that bats whose eyes were sealed up with varnish, or even completely destroyed, made their way with apparent ease not only through dark rooms, but in places where strings had been stretched across the path in various directions, and other obstacles had to be avoided. These blinded bats never collided with such obstructions, but seemed able to approach a wall at ease, alight upon a perch, or even find a small cavity without apparently searching for it.

For a similar purpose of information many bats are furnished with extraordinary membranous appendages upon the nostrils and ears, which give to some of them the most grotesque appearance. In the large fruit-eating fox-headed bats of the East Indies, which are more nearly diurnal than any others, the ears are of no great size, and the nose is defended only by long hairs about the nostrils and eyelids; but in all the smaller, insect-eating, nocturnal bats, there arise upon the nostrils leaf-like appendages, sometimes very large and complicated, which resemble the leathery substance of the wings, and in such species, the ears are often several times larger in area than all the rest of the face. These great ears must not only collect sounds far too faint for us to hear, but their membranes are as nervous and sensitive as those of the wings, probably being able to feel degrees of density in the air entirely imperceptible to most other creatures.

Bats are divisible into two groups or sub-orders, the *Megachiroptera*, and the *Microchiroptera*. The first group contains the fruit-eating bats whose large size, reddish fur, and fox-like head have given them the name of flying foxes (q.v.). Their chief distinguishing feature, however, is the fact that the molar teeth are not

tubercular but are marked with a longitudinal furrow. They live mainly upon fruit and are confined to the tropics of the Old World, and are all included in a single family, *Pteropodidae*. The *Microchiroptera* have molars with sharp cusps adapted to cutting and crushing the insects upon which they mainly subsist. This group includes all of the ordinary bats, of which those most familiar in North America and Europe belong to the large and typical family *Vespertilionidae*, of which nearly 200 species are named. Among the most numerous and widespread of the North American bats, are the large heavy bat (*Lasiurus cinereus*) of the north-eastern States; but it keeps to the woods and is not often seen; it migrates to the southern States in winter. It is about 5.50 inches long. Another common bat of the woods is the smaller, silver-haired (*Lasionycterus noctivagans*). The red bat (length 4.40 inches) is numerous in the Alleghanian region, inhabiting caves in great companies; but the "common" bat of the whole country east of the Rockies, is the little, glossy, brown familiar of our homes and gardens, as well as of the woods, which remains with us the year around, hibernating during cold weather in the hollow trees, caves, and crevices about buildings, where they make their home, and whence they emerge at night, to seek their prey about our farmyards and gardens. As the insects caught are mainly mosquitos and similar pests, and as they do no harm, they should be encouraged, rather than feared and persecuted. "Awake at the most," says Cram, "some four out of every 24 hours of their drowsy little lives, they never make any nests or even attempt to fix over the crannies where they hide and where the little bats are born. These helpless little things are not left at home at the mercy of foraging rats and mice. When the old bat flits off into the twilight, the youngsters often go with her, clinging about her neck. . . . At times, she deposits them on the branch of a tree, where they hang, sheltered by the leaves."

The lower Mississippi Valley has a yellowish bat, called "big-eared" (*Corynorhinus macrotis*) which differs from the others in that its great ears are joined together by their bases in front.

For a systematic account of the bats of the world consult Dobson, 'Catalogue of Chiroptera in the British Museum' (1878), and his subsequent papers, mentioned in Flower's 'Mammalia' (1891). For North American forms consult H. Allen, 'Bats of North America' (Smithsonian Institution, Washington, 1893). For habits, etc., see the writings of Harlan, Audubon, Baird, Godman, E. A. Mearns, C. L. Herrick, G. S. Miller, and especially C. H. Merriam, 'Mammals of the Adirondacks' (Linnæan Society, New York, 1893); Stone and Cram, 'American Animals' (1902); Gosse, 'A Naturalist's Sojourn in Jamaica' (1851). See also FOX-BAT; FRUIT-BAT; LEAF-NOSED BATS; VAMPIRE, and similar titles.

Bat-parasites. Besides bugs (see BED-BUG) certain very strangely modified wingless flies are in rare cases found living on bats in Africa and the East Indies. They are somewhat spider like, with a narrow eyeless head, though four ocelli are present in some species, which rests on the back of the thorax, while the legs are large, long, and sprawling, ending in large claws. They are only a line or two in length.

BATABANO — BATAVI

The larva is, like that of the sheep-tick (q.v.) and horse-fly (*Hippobosca*), very peculiar, the maggot being probably nourished in the dilated oviduct of the fly, then attaining its full growth, when it is expelled in the shape of a broad, short puparium, the skin being hardened by the excretion of chitin.

Batabano, ba-ta-ba-nō', Cuba, a town in the province of Havana near the south coast, 37 miles from Havana, by rail. San Cristobal de la Habana was founded on the site of the modern Batabano by Diego Velasquez in 1514. Pop. (1899) 1,025.

Batac, ba-tak', or **Batag**, Philippines, an island about one and a half miles off the north-east coast of Samar, the most northerly of that portion of the Philippine islands which goes under the designation of Visaya, or Bisaya. Area 18 square miles.

Batac, or **Batag**, Philippines, a town of Luzon in the province of Ilocos Norte, founded in 1587. It is situated 10 miles south of Laoag. Pop. (1898) 17,625.

Batak, bā'tak, Bulgaria, a district and town southwest of Philippopolis. The region became prominent in European history in the time of the Bulgarian insurrection against Turkey in 1876. In May of that year the villagers of Batak were preparing to take part in the insurrection, when the place was attacked by a force of Bashu-Bazouks under the command of Achmet Agha of Dopat. After a short struggle, the village was surrendered and the inhabitants gave up their weapons, on the assurance of the Turkish commander that "not a hair of their heads should be touched." On 9 May 1876 the Turks began one of the most cruel massacres recorded in history; the inhabitants of the unfortunate village were butchered and those who took refuge in the church were burned to death by the Turkish soldiers. Mr Baring, the English commissioner, visiting the place two months later, found but one survivor, an old woman. The Turkish government rewarded Achmet with a decoration of honor. The news of the massacre at Batak and of other "Bulgarian atrocities," aroused all Europe and furnished Russia with an excellent pretext for declaring war against Turkey in 1877. See also BULGARIA; SAN STEFANO, TREATY OF; TURKEY.

Bataleur, ba-ta-lér', a large, voluminously crested eagle of Africa, named *Helotarsus ecandatus* with reference to the unusual shortness of its tail. It has the handsomest plumage of all the eagles, presenting bold contrasts of rich maroon, black, and gray, with bronzy reflections from the wings. It feeds mainly on lizards and snakes, attacking the latter, even when venomous, by blows of its powerful beak. Its breeding season, which is at the commencement of the hot weather when other birds are busy at other things, seems to be placed with reference to the greater ease with which snakes can then be captured, when the grass dies down or burns off, exposing them to view.

Batalha, bā-tāl'ya, a village in Portugal, 69 miles north of Lisbon, famed for its Dominican convent, founded by King John I., in commemoration of a victory over the king of Castile in the year 1385. This convent is one of the most splendid buildings in Europe and is 576 feet

long and 443 wide. Its church, in which lie the remains of the founder and the following three kings of the house of Aviz, as well as those of Prince Henry the Navigator, is a beautiful edifice, adorned with many art treasures.

Batan, bā'tan, Philippines, a province of the island of Luzon, forming the peninsula between the bay of Manila and the China Sea; area, 450 square miles; chief town, Bolanga. It is noted for many excellent varieties of marble, which are extensively used in the churches and public buildings of Manila and other towns of the Philippines. The inhabitants of the towns and coasts of this province are of the Tagalog race, but, besides these, the mountain fastnesses are inhabited by numerous tribes of Negritos.

Batan, Philippines, a town on the island of Panay, in the province of Capiz, 31 miles from Capiz. Pop. (1898) 12,908.

Batan, or **Bashi Islands**, a group of small islands in the Chinese Sea, discovered by Dampier in 1687, and now forming a dependency of the Philippines, north of which they are situated, midway between Luzon and Formosa. American control was established over these islands in March 1900, with Teófilo Costillejo as first governor. The Batans are bounded on the north by Bashi Channel, which divides the Philippines from the Japanese insular territory, and have an area of 125 square miles and a population estimated at 9,500. The principal islands in the group are Ibayal, Basay, Saptan, and Hujos. Santo Domingo de Basco, the principal town and port, is about 500 miles from Manila, and has a population of about 3,000. The other large towns are San Bartolome de Calayan, San Carlos de Marigatao, San José de Ibana, Santa Maria de Mayan, and San Vicente de Saptan. Under Spanish rule Santo Domingo was the residence of a political military governor, a judge and an attorney-general.

Batangas, ba-tan'gas, Philippines, a town on the island of Luzon, 58 miles south of Manila. It was founded in 1581, and is situated on the large bay of Batangas, opening into the Strait of Mindoro. It is well-built, containing several spacious streets, in which are many elegant mansions. The city has an excellent harbor, and prior to the war between the United States and Spain was the seat of a large commerce. The province is one of the richest sugar growing districts in the Philippines; but the industry is far inferior to its possibilities owing to the lack of proper machinery and modern methods of treatment. It is also notable for its large production of cocoanut oil, the larger part of which is used for domestic purposes, chiefly lamp oil and lubricating machinery. Such of it as is exported to Europe, after being solidified, is manufactured into soap and candles. Pop. 39,358.

Batatas, ba-tā'tas. See SWEET POTATO.

Bata'vi, an old German nation which inhabited a part of the present Holland, especially the island called Batavia, formed by that branch of the Rhine which empties itself into the sea near Leyden, together with the Waal and the Meuse. Their territories, however, extended much beyond the Waal. Their bravery was commended by Tacitus. According to him, they were originally the same as the Catti, a German tribe which had emigrated from their country on

BATAVIA — BATCHELLER

account of domestic troubles. This must have happened before the time of Cæsar. When Germanicus was about to invade Germany from the sea, he made their island the rendezvous of his fleet. Being subjected by the Romans, they served them with such courage and fidelity as to obtain the title of their friends and brethren. They were exempted from tributes and taxes, and permitted to choose their leaders among themselves. Their cavalry was particularly excellent. During the reign of Vespasian they revolted, under the command of Civilis, from the Romans, and extorted from them favorable terms of peace. Trajan and Adrian subjected them again. At the end of the 3rd century the Salian Franks obtained possession of the island of Batavia. See BATAVIAN REPUBLIC

Batavia, properly the name of the island occupied by the ancient Batavi, became at a later date the Latin name for Holland and the whole kingdom of the Netherlands. The name Batavian Republic (q.v.) was given to the Netherlands on their new organization, 16 May 1795, and they continued to bear it till the establishment of the kingdom of Holland, under Louis Bonaparte, 8 June 1806.

Batavia, Java, a city and seaport on the north coast of the island, near the west end, and the capital of all the Dutch East Indies, lon. 106° 50' E.; lat. 6° 8' S. It is situated on a wide, deep bay, in which are interspersed many low, green islets, within which ships find safe anchorage, the roadstead being sheltered from the northwest monsoon. The largest of these islets is Onrust, at which all ships above 300 tons burden have to anchor. The town consists of two portions. The old is situated in a low, marshy plain near the sea, and intersected by the Great River and sundry canals, is exceedingly unhealthy, and subject to an intermittent fever, very fatal to strangers. Much has been done, however, to diminish the unhealthiness by draining the marshes, and letting currents of water into the stagnant canals. The old is still the business quarter and contains the principal warehouses and offices of the Europeans, the Java Bank, and the exchange. On the west side of the Great River is the Chinese quarter, inhabited entirely by Chinese. Batavia is the chief mart among the islands of the Asiatic Archipelago for the products of the Eastern seas and the manufactures of the West, and its commerce is correspondingly important. Batavia was founded by the Dutch in 1619, and attained its greatest prosperity in the beginning of the 18th century, when it had about 150,000 inhabitants. The most important edifices are the Stadt-house, Calvinistic, Lutheran, and Portuguese churches, some Mohammedan mosques and Chinese temples. Pop. (1900) 115,567. The inhabitants are chiefly of Malay extraction, with a considerable admixture of Chinese, and a small number of Europeans (Dutch, English, and Portuguese). A United States consul resides here. See JAVA.

Batavia, Ill., a town in Kane County, on the Fox River, and on the Chicago & N. W. and Chicago, B. & Q. R.R.'s; 37 miles west of Chicago. Here is the State Asylum for the Insane, and 9 churches, public schools and public library. Among the industries are stone quarries, farm implement works, and wagon factories. Batavia

was settled in 1834 and incorporated in 1856. Pop. (1900) 3,871.

Batavia, N. Y., a town and county-seat of Genesee County, on Tonawanda Creek and several railroads; 37 miles east of Buffalo and 32 miles west of Rochester; on the New York C & H. R., the Lehigh Valley, and Lake Erie & W. R.R.'s. It is in an agricultural region; has manufactories of plows and harvesters, carriage wheels, and shoes, and contains the State institution for the Blind, the Dean Richmond Memorial Library, national banks, daily and weekly newspapers. Batavia was the home of William Morgan, made famous through the Anti-Masonic excitement in 1826. Pop. (1900) 9,180.

Batavian Republic, the name adopted by the Seven United Provinces of the Netherlands soon after the French Revolution, and acknowledged by the powers of Europe. The whole republic was declared one and indivisible; all members of society were declared equal in the eye of the law, without respect to rank or birth; all religious societies, acknowledging a Supreme Being, equally protected by law. Feudality was abolished, all fiefs declared allodial, and possessors of lordships to be indemnified. In 1806 the form of government was changed into that of a kingdom, under the name of Holland; and the Batavian republic fell nominally under the sway of Louis Bonaparte as its sovereign, but really under that of his brother Napoleon. See NETHERLANDS

Batie, ba-bê, **Anselme Polycarpe**, French jurist and politician: b. Seissan, 31 May 1828; d. Paris, 30 June 1887. He first belonged to the faculties of law at Dijon and Toulouse, but, in 1862, he became professor of constitutional law at Paris. Elected to the National Assembly (February 1871), he became one of the leaders of the Monarchist party. In Broglie's reactionary cabinet (1873) he was made minister of public instruction. After 1876 he was a member of the Senate. He wrote 'Turgot, Philosopher, Economist, and Administrator' (1860); 'Course of Political Economy' (1864); 'New Course of Political Economy' (1865); 'The Public Credit' (1865); 'Summary of the Course of Public and Administrative Law' (1885), and 'Theoretical and Practical Treatise on Public and Administrative Law' (1885).

Batchelder, **Richard Napoleon**, American military officer: b. Lake Village, N. H., 27 July 1832. He entered the Union army at the beginning of the Civil War; and was brevetted brigadier-general, United States Volunteers, 13 March 1865; became brigadier-general and quartermaster-general, United States Army, 26 June 1890; and was retired 27 July 1896. He was awarded a Congressional medal of honor for most distinguished gallantry in action during the Civil War.

Batcheller, **George Sherman**, American jurist: b. Batchellerville, N. Y., 25 July 1837. He was admitted to the bar in 1858; entered the Union army at the beginning of the Civil War; was taken prisoner at Harper's Ferry, and exchanged in 1863; was then appointed deputy provost-marshal-general of the Department of the South; and, in 1865-70 was inspector-general on the staff of Governor Fenton of New York. In 1883 he became president of the International Tribunal of Egypt; in 1889, assistant secretary of the United States Treasury; in 1890,

BATCHELOR—BATES

United States minister-resident and consul-general to Portugal; and in 1897, again a member of the International Tribunal of Egypt. In the last-named year he received from King Humbert the decoration of the great cordon of the Order of the Crown of Italy, in recognition of his services as president of the Universal Postal Congress which met in Washington in May 1897.

Batchelor, George, American Unitarian clergyman: b. Southbury, Conn., 1836. He was secretary of the American Unitarian Association 1893-7, and has since been editor of the 'Christian Register,' published in Boston. He has also been secretary of the National Unitarian Conference 1870-80, and its chairman 1893-4. He is the author of 'Social Equilibrium.'

Batchian, bat-shyan', or **Batian**, one of the Moluccas, west of the southern peninsula of the large island of Halmahera or Gilolo. Area, 835 square miles; pop. about 11,000. It belongs to the Dutch residency of Ternate, consists of two peninsulas joined by a narrow isthmus, and has many mountains. Batchian produces gold, copper, much coal, sago, cocoanut trees, rice, cloves, and fine timber.

Bate, William Brimage, American legislator: b. near Castalian Springs, Tenn., 7 Oct. 1826. He served as a volunteer through the Mexican war; was graduated at the Lebanon Law School in 1852; elected attorney-general of the Nashville district in 1854; and was presidential elector in 1860. In the Civil War he rose from private to the rank of major-general in the Confederate army, and was three times dangerously wounded. He was an elector-at-large for Tennessee on the Democratic ticket in 1876; was elected governor in 1882 and 1884; and a United States senator in 1887, 1893, and 1899.

Bateman, Kate Josephine, American actress: b. Baltimore, Md., 7 Oct. 1842. About 1851 she and her sister Ellen began to act, being known as the Bateman Sisters. Kate began, in 1861, to play Juliet, Pauline, etc., but was especially successful in Leah. She became rich and famous, and, having married George Crowe, an English physician, identified herself with the management of a London theatre.

Bateman, Newton, American educator: b. Fairfield, N. J., 27 July 1822; d. Galesburg, Ill., 21 Oct. 1897. He graduated from Illinois College, 1843, and studied at Lane Theological Seminary, but began to teach instead of entering the ministry. He was professor of mathematics at St. Charles College, 1847-51; State superintendent of public instruction, 1858-63; member of the State board of health, 1877-97; and president of Knox College, 1875-92, when ill-health caused his retirement. His official reports are of high value in educational literature, and much of the excellence of the Illinois school laws is due to his wisdom and foresight. He published 'School Laws of Illinois' (1865; 12th ed. 1866); 'School Laws and Common School Decisions of the State of Illinois'; revised by W. L. Pillsbury (1888).

Bates, Alfred E., American military officer: b. Monroe, Mich., 15 July 1840. He graduated at the United States Military Academy in 1865; commissioned a second lieutenant in the 2nd Cavalry; promoted to first lieutenant, 19

Oct. 1865; transferred to pay department with the rank of lieutenant-colonel, 7 Jan. 1897; promoted colonel and assistant paymaster-general, 31 March 1899; and brigadier-general and paymaster-general, 12 July following. He served for several years as military attaché to the United States Embassy in London, and was a brigadier-general of volunteers in the war with Spain in 1898.

Bates, Arlo, American author: b. East Machias, Me., 16 Dec. 1850. He graduated from Bowdoin in 1876, when he engaged in literary work in Boston, editing the *Sunday Courier*, 1880-93; and afterward became professor of English Literature in the Massachusetts Institute of Technology. He is author of poems and novels, including 'The Pagans' (New York 1884); 'A Lad's Love'; 'The Wheel of Fire' (1885); 'The Philistines' (1888); 'Berries of the Brier' (1886), poems; 'Told in the Gate' (1892); 'Talks on Writing English'; 'Talks on the Study of Literature' (1897); 'The Puritans' (1899); 'Under the Beech Tree' (1899); 'Diary of a Saint' (1902).

Bates, Barnabas, American clergyman; an active promoter of cheap postage in the United States: b. Edmonton, England, 1785; d. Boston, Mass., 11 Oct. 1853. He came to America at an early age, became a Baptist preacher in Rhode Island, and was, for a time, collector of the port of Bristol. In 1825, having become a Unitarian, he established a weekly journal in New York, called the *Christian Inquirer*. During Jackson's administration he received an appointment under Samuel Gouverneur, postmaster of New York, and for some time performed the duties of postmaster himself. The information gained in this capacity, first interested him in the question of cheap postage. He investigated the subject for years, wrote, published pamphlets, and lectured throughout the country, and finally effected a material reduction in the rates of land postage. He was endeavoring to obtain a corresponding reform in ocean postage at the time of his death.

Bates, Blanche, American actress: b. Portland, Oregon, 1873. She made her first appearance in 1894 in San Francisco, taking a part in Brander Matthews' one-act play 'This Picture and That.' Her first success was as Mrs. Hillary in 'The Senator,' and she has played the leading comedy roles in 'The Last Word,' 'The Railroad of Love,' 'Transit of Leo,' and 'The International Match.' Her acting of Nora in 'A Doll's House' (the first Ibsen play presented on the Pacific coast) was a distinct artistic triumph. She has also taken leading parts in 'The Charity Ball,' 'Sweet Lavender,' 'The Dancing Girl,' and others. Her phenomenal success in 'The Great Ruby' (1899); as Miladi in 'The Three Musketeers' (1899); and in Long and Belasco's 'Darling of the Gods' (1902-3), has given her a place of assured prominence on the American stage. See Strang, 'Famous Actresses of the Day' (1899).

Bates, Charlotte Fiske, American poet and miscellaneous prose-writer: b. New York, 30 Nov. 1838. She was educated in Cambridge, Mass.; assisted Longfellow in compiling 'Poems of Places'; edited the 'Cambridge Book of Poetry and Song' (Boston, 1882); 'The Longfellow Birthday Book'; and 'Seven Voices of Sympathy'; has contributed to magazines; and

BATES — BATESVILLE

has published 'Risk and Other Poems' (1879). She was married in 1891 to Adolphe Rogé, who died in 1896.

Bates, Clara (Dory), American author: b. Ann Arbor, Mich., 1838; d. 1895. She lived in Chicago and published many juvenile books; also 'From Heart's Content' (1892).

Bates, David, American poet: b. 1810; d. Philadelphia, 25 Jan. 1870. He was the author of the well-known poem 'Speak Gently.' In 1848 his poems were published under the title, 'The Eolian.'

Bates, Edward, American lawyer: b. Belmont, Va., 4 Sept. 1793; d. 25 March 1869. Having settled in Missouri, he served in the legislature and constitutional convention, and in Congress in 1827-9. He was attorney-general of the United States in Lincoln's first administration; and had been a candidate for the presidential nomination in 1860.

Bates, Harriet Leonora (Vose), better known as ELEANOR PUTNAM, American story and sketch writer, wife of Arlo Bates: b. 1856; d. 1886. She wrote 'A Woodland Wooing'; 'Old Salem' (1886); with her husband, 'Prince Vance,' etc.

Bates, Henry Walter, English traveler and naturalist: b. Leicester, 8 Feb. 1825, d. 16 Feb. 1892. He was apprenticed to a hosiery manufacturer in Leicester, but joined the Mechanics' Institute, and devoted himself before and after business hours to study. His interest in natural history led to a correspondence with A. R. Wallace, with whom he left England in 1847 for the river Amazon. In this region he remained for 11 years, pursuing scientific investigations, particularly in entomology, in remote places, at the cost of shattered health. Returning to England he published, in 1862, 'The Naturalist on the River Amazons,' a work which attained immediate success, and is still regarded as a classical book of travel. In it he enumerated as many as 8,000 new species of insects. He gained the friendship of Charles Darwin, who expressed high appreciation of Bates' memoir, published by the Linnean Society, entitled 'Contributions to an Insect Fauna of the Amazon Valley,' in which was given to the scientific world the phenomenon of mimicry with a philosophical explanation. Bates was made a Fellow of the Royal Society in 1881. In 1854 he was appointed assistant secretary to the Royal Geographical Society, which office he retained till his death.

Bates, John Coalter, American military officer: b. St. Charles County, Mo., 26 Aug. 1842. He entered the regular army as a lieutenant in the 11th United States infantry, 14 May 1861; served on the staff of General Meade from the battle of Gettysburg to the close of the war. On 4 May 1868 he was appointed a brigadier-general of volunteers; on 8 July was promoted to major-general for his services in the Santiago campaign; on 13 April 1899 was honorably discharged under this commission, and on the same day recommissioned a brigadier-general of volunteers. In February 1899 he was appointed military governor of the province of Santa Clara, Cuba, and in April following, was ordered to duty in the Philippines, where he several times greatly distinguished himself in the latter part of that year

and the early part of 1900. In March 1900 he was assigned to the command of the department of southern Luzon, and for his eminent services there and on the Sulu group was promoted major-general, 9 June 1902.

Bates, John Lewis, American statesman: b. North Easton, Mass., 18 Sept. 1859. He graduated at the Boston University in 1882; was a private tutor at Jamestown, N. Y., 1883; returned to Boston and was admitted to the bar in 1885; elected to State legislature on the Republican ticket 1894; elected lieutenant-governor in 1900 and became governor of Massachusetts in 1902.

Bates, Joshua, American financier: b. Weymouth, Mass., 1788, d. 24 Sept. 1864. He entered the counting house of William Gray & Son, of Boston, at the age of 15, and later was sent to Europe as their agent. In 1828 he became a member of the house of Baring Brothers & Company, in London, and subsequently its senior partner. In 1854 he was appointed umpire to the joint British and American Commission for the settlement of claims arising from the War of 1812. He was the principal founder of the Boston Public Library, and in 1852, the first year of its existence, he made it a gift of \$50,000, and later gave it 30,000 volumes. Its main reading room is named "Bates Hall" in his honor.

Bates, Katharine Lee, American story writer, poet, and educator: b. Falmouth, Mass., 12 Aug. 1859. She was called to the chair of English literature in Wellesley College in 1891; and has edited collections of ballads, etc.; and written juvenile stories, including 'Rose and Thorn' (1889), also 'The English Religious Drama' (1893); and 'The College Beautiful and Other Poems' (1887); 'History of American Literature' (1898); 'Spanish Highways and Byways' (1900).

Bates, Samuel Penniman, American historian: b. Mendon, Mass., 29 Jan. 1827. He has been principal of Meadville Academy, Pa.; superintendent of schools in Crawford County, Pa., 1857-60; deputy state superintendent of schools, 1860-6; and State historian, 1866-73. Among his publications are the 'Lives of the Governors of Pennsylvania' (1873); 'Lectures on Mental and Moral Culture' (1859); 'History of the Battle of Gettysburg' (1878); 'History of the Battle of Chancellorsville' (1882).

Bates College, a co-educational institution in Lewiston, Me.: organized 1864, under the auspices of the Free Baptist Church, and the first college on the Atlantic coast to provide for the higher education of women. It has an endowment of \$370,000, while the grounds and buildings are valued at about \$300,000. In 1901 there were 330 students and 21 professors and instructors. Volumes in library, 24,000.

Batesville, Ark., a town and county-seat of Independence County: situated on the White River and on a branch of the St. Louis, I. M. & S. R.R. It is the seat of Arkansas College, a Presbyterian institution. The river is navigable for steamboats to this point and the United States government is providing a system of locks and dams to insure navigation for 100 miles above the town. It contains immense

BATFISH — BATH AND BATHING

quarries of marble and other stone, and there are woollen mills, flouring mills, furniture factories, etc. Pop. (1900) 2,327.

Batfish, a sea-fish (*Malthe vespertilio*) of low organization, constituting the family *Maltheidae*, allied to the goosefishes (*Lophidae*), which creeps about the bottom like a huge toad and feeds upon whatever comes within its reach. It is numerous in all warm seas, and some related forms inhabit the deeper parts of the ocean. See GOOSEFISH.

Bath, England, a city in Somersetshire, 107 miles west of London. It is beautifully situated on the Avon, in a narrow valley bounded on the northeast and southwest by hills, and widening on the northwest into rich and extensive meadows. The Avon is navigable from Bath to Bristol. Bath is noted for its places of amusement, its fine streets, and the magnificence of its public buildings. The houses are of superior construction, built of freestone, obtained from the hills about the town. The Abbey Church ranks as one of the finest specimens of perpendicular Gothic architecture. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day; and the baths are both elegant and commodious. The temperature of the springs varies from 100° to 117° F. They contain carbonic acid, chloride of sodium and of magnesium, sulphate of soda, carbonate and sulphate of lime, etc. Bath was founded by the Romans, and called by them *Aqua Solis* (waters of the sun). Among the Roman remains discovered here have been some fine baths. The height of its prosperity was reached, however, in the 18th century, when Beau Nash was leader of the fashion and master of its ceremonies. Since then, although it still attracts large numbers of visitors, it has become the resort of valetudinarians chiefly. Jointly with Wells it is the head of a diocese, and returns two members to the House of Commons. Pop. (1901) 49,817.

Bath, Me., city, port of entry, and county-seat of Sagadahoc County, on the Kennebec River, and the Maine C. R.R.; 12 miles from the ocean and 30 miles south of Augusta and 36 miles northeast of Portland. It is admirably situated as a commercial port; has regular steamboat connections with Boston and Portland; is principally engaged in shipbuilding, both wood and iron; and has manufactories of brass and iron goods, oil cloth, shoes, and lumber. The Bath Iron Works have built the gun-boats *Machias* and *Castine*, the ram *Katahdin*, and several of the modern torpedo boats for the United States navy. Bath has a large coastwise and foreign trade in ice, coal, lumber, hay, iron, and steel; and contains four national banks, public library, a costly system of waterworks, and property valued at \$7,000,000. Pop. (1900) 10,477.

Bath, N. Y., town and county-seat of Steuben County, on the Cohocton Creek, 36 miles west of Elmira, on the Buffalo branch of the Erie, and the Delaware, L. & W. R.R.'s. It is the seat of the New York State Soldiers and Sailors' Home, the Davenport Home for Orphan Girls, and Haverling Academy; is principally engaged in agriculture; and has manu-

factories of shoes, sash and blinds, harness, etc. It is governed by a mayor, annually elected, and a town council. Pop. (1900) 4,994.

Bath and Bathing. The use of the bath is primarily for purposes of cleanliness, but it also subserves various other useful ends. Bathing undoubtedly took place first in rivers and in the sea, but men soon learned to enjoy this pleasure in their own houses. Even Homer mentions the use of the bath as an old custom. When Ulysses enters the palace of Circe, a bath is prepared for him, after which he is anointed with costly perfumes, and dressed in rich garments. In later times, rooms, both public and private, were built expressly for the purpose of bathing. The public baths of the Greeks were mostly connected with the gymnasia, because a bath was taken immediately after the athletic exercises. The Romans imitated the Greeks in this matter, and built magnificent baths in which both males and females could bathe (in separate divisions), and warm or cold baths could be taken; such establishments, indeed, were so extensive that even their ruins excite admiration.

The Cold Bath—The first effect of the cold bath (at a temperature say from 50° to 70°) is to produce a shock to the nerves of the skin. In the case of the cold bath as ordinarily used, the application is short, and the more near to the temperature of 50° F the water is the shorter it should be. Following the first action is reaction, during which the blood returns to the skin, the blood vessels of which relax, and a pleasant sensation of glow, spreading rapidly over the surface, is experienced. This reaction is aided by rapid friction of the skin, as by towels, and if, after drying, the body is quickly clothed and exercise engaged in, the total effect of the bath is stimulating, inducing a feeling not only of warmth but also of vigor. The length of time the cold may be applied without interfering with the setting in of a proper reaction depends on the individual. A mere instant's immersion is sufficient for some, others can bear several minutes, while some could not bear complete immersion of the body at all, a feeling of coldness and shivering lasting for hours after it. Obviously for such persons the full cold bath is not suitable, and the cold wet towel, cold wet sponge, wet sheet, etc., may be used instead, and may gradually lead up to the full cold plunge, which may thus be made tolerable and enjoyable. The cold bath is not usually suitable for the old and the delicate. The action of the cold water may be intensified by showering it or spraying it on the body by means of various arrangements of pipes, etc. The morning or early part of the day is the suitable time for all such kinds of baths. Persons who are thus habituated to the use of cold water are less susceptible to the influence of cold and can stand longer exposure than others.

Tepid Baths (temperature 85° to 95°) produce neither depression nor excitement, and are therefore suited for all. They are the best when prolonged immersion is desired, as in the treatment of chronic skin and nervous diseases.

The Warm Bath (temperature 96° to 104°) is particularly serviceable in removing feelings of fatigue. It should quicken only slightly

BATH AND BATHING

the circulation, and bring an additional quantity of blood to the skin. It is by this means that it removes the tired feeling from exhausted muscles, for it promotes the removal from the tissues of the waste products, which have accumulated during the period of activity, and whose presence in the muscles is the cause of the feeling of weariness. After prolonged labor, or a long fatiguing walk, or prolonged exposure to damp and cold, or after, for example, the exertion of much dancing, nothing is so restorative and refreshing as a warm bath. When employed for such purposes, the person should end with a spray or douche, or simple sponge of tepid water (70°) if he is about to go to bed, or with a warm spray, quickly reduced to cold, before dressing to go out. Warm baths are largely employed in feverish affections of children for promoting the action of the skin; and they are a safe resort in the convulsions of children, cold being at the same time applied to the head.

The hot bath (temperature 102° to 110°) acts in a more pronounced way upon the heart and nervous system than the merely warm bath. If very hot it powerfully excites the heart, whose action, indeed, it may stimulate to violence. The brain is also influenced by the more copious flow of blood through it, due to the vigorous action of the heart. These effects, however, are largely counterbalanced by the increased flow of blood to the skin. But the prolonged use of hot baths is weakening, and the temporary strain thrown upon the heart and blood-vessels and brain would be hurtful to many. The bather should be immersed to the chin; the hair is damped with cold water, and a thin cold cloth is wrapped about the head. Cold water may be drunk if desired. The bath should last 20 minutes, or less if oppression is felt. It should conclude, as directed for warm bath, with tepid douche or sponging, or with warm spray quickly reduced to cold. The hot bath should not be used in the morning or early part of the day, or at any time except before going to bed, unless the person is properly cooled down before dressing and going out.

The Hot-air Bath is one of the most powerful ways of stimulating the activity of the skin. The person, unclothed, is placed in an apartment which is heated by means of furnaces, the air being dry. In a longer or shorter time, according to the heat of the air and the condition of the bather, the perspiration bursts out upon the skin, becoming very copious, so that the whole body is bathed in sweat. A very high temperature may be borne so long as the air is quite dry, for the sweat passes rapidly off from the body in the form of vapor, removing a large quantity of heat, and thus the temperature of the body does not rise, unless the air is very hot, when the heat of the body usually increases by two or three degrees. The same high temperature could not be borne if the air were moist, as in the case of a vapor bath, for then the air is saturated or nearly so with moisture and cannot take up more, or can take up very little. Marked oppression, difficulty of breathing, fullness in the head, faintness, etc., would then speedily arise. When the air is quite dry, however, a high temperature, for example, that of 180° F., can usually be endured with ease, and even above

212°. Not only the activity of the skin, but the action of the heart and of breathing are greatly increased. It is thus not suited for everyone, certainly not in its full form for anyone with weak heart or vessels, and for very full-blooded persons.

The Turkish Bath.—The hot-air bath is usually obtained with other accessories in the form of the Turkish bath. This bath was adopted by the Turks from the Romans, who derived it from the Greeks. The bather enters the dressing-room (Rom *vestiarium*) which is heated to an ordinarily comfortable temperature. Beyond this room there are, in the fully-equipped Turkish baths, three rooms, separated from the dressing-room by well-padded doors. The first of these corresponds to the Roman *tepidarium*, the warm room, in which the temperature is from 115° to 120°; beyond this and separated from it by heavy curtains is the hot room, or *calidarium*, in which the temperature ranges from 120° to 140°, and still beyond is the hottest room, called also the flue room, corresponding to the Roman *laconicum*. Here the temperature is not below 150°, usually 175° to 180°, but may be 200° and upward. Every Turkish bath has at least two rooms beyond the dressing-room, one in which the temperature may readily be raised to 140° or thereby, and one beyond it in which the highest temperatures may be obtained.

When a full Turkish bath is taken the following is the usual course. The bather undresses in one of the curtained recesses of the dressing-room, girds a towel or similar cloth round his loins, and carrying a bath-towel over the arm passes into the warm room. Here he stays only long enough to wet the hair with cold water, and perhaps drink of it, and then passes on through the hot room, into the hottest room. Spreading his towel over a chair he reclines on it, wets his head with cold water, and drinks at his pleasure, but not too copiously, of cold water, which the attendant will bring him. Here he remains 5 or 10 minutes. By this time the whole body will be bedewed with perspiration; and the bather passes out into the room next in temperature, the hot room, where he reclines for another 10 or 15 minutes. Then he passes to the warm room, lower in temperature than the former, and here he reclines till the attendant is ready for him, when he proceeds to the washing room. Here he lies on a table and the attendant goes over the whole body, rubbing the surface, and thus removing all loose effete skin, grasping and kneading the muscles, bending joints and so on. He is then rubbed over with soap, scrubbed and washed down, and lastly doused with warm and then tepid and cold water. From this room the bather passes out quickly, plunges through a cold bath, and regains the dressing-room, where he is quickly dried down with warm dry towels. He is then enveloped in a dry bath-towel, and so attired he lies down on his couch in the dressing-room, covered over with a light rug or blanket, till his skin assumes its natural degree of warmth. When the skin is cool and dry, usually in 15 or 20 minutes, the bather dresses deliberately, and may then go out. The ordinary duration of the full bath, from the flue room to the washing room, is from 40 minutes

BATH BRICK

to an hour. The full bath, however, is suited chiefly for those accustomed to it, for the healthy and robust.

The vapor bath acts upon the body much as the hot-water bath does, but it acts more powerfully, though the effect of the heat is not so quick since vapor is a slower conductor of heat than water. This bath can, therefore, be borne hotter than a water bath, but the high temperature cannot be borne long, for the vapor does not permit of the loss of heat from the body as hot air does. The temperature of the vapor bath cannot be comfortably endured above 120° F. The vapor bath is characteristic of the Russian baths. It is taken in a chamber filled with vapor, which is thus not only applied to the surface of the body but also inhaled. This makes it still more oppressive. It may be used, however, in a simple form, in which the vapor is not breathed, by the person sitting on a chair, surrounded from the neck downward by blankets, which envelop the chair also and hang to the ground. Under the chair is placed a shallow earthenware or metal dish, containing boiling water to the depth of 3 or 4 inches. In the water are placed a couple of red-hot bricks. Or under the chair may be placed a spirit-lamp, supported above it being a shallow pan containing boiling water. Such baths are very useful for catarrh, for rheumatic and neuralgic pains, sciatica, etc., as well as for cases where excessive action of the skin is desired to relieve deeper organs, for example the kidneys. Ten to fifteen minutes are long enough for exposure in the vapor bath.

Sea-Bathing—Ordinary sea-bathing is of course cold, and produces the stimulating effects described in regard to the cold bath. There is besides the additional stimulus due to the salt, so that sea-bathing acts as an invigorating tonic. It is not, however, suited for everyone, and is taken much too indiscriminately. It is also indulged in without due precaution. It is a very common error for persons to remain in the sea too long, the result being shivering, blueness of the skin, difficulty in recovering warmth, headache, etc. Persons who are anæmic,—that is, of deficient quality of blood,—ought not to indulge in sea-bathing without advice, and failing advice had better try first a salt-water bath at home. Persons who have suffered from any internal complaint ought also to refrain. The best time for sea-bathing is in the morning. It should never be indulged in immediately after a meal, when the business of digestion is going actively forward. A good time is before lunch or early dinner, for which the brisk walk home after the bath will prove an excellent appetizer. Neither should sea-bathing be engaged in immediately after very active exercise, when the body is in a state of very active perspiration or in a condition of fatigue. At the same time, moderate exercise before the bath is unobjectionable, and the body ought to be comfortably warm. The person should undress quickly and plunge in boldly, wetting the whole body at once. During the bath exercise should be active, as in continued swimming. Children, because of the little resisting power of their bodies are readily depressed by sea-bathing. They may be gradually accustomed to it; but they ought not to be forcibly immersed to their

aversion and terror. Sea-baths may be imitated at home by the addition of common salt or sea salt to water. The benefits of open-air bathing,—sea or river,—are not limited, of course, to the action of the water, but are increased by the action of the fresh air, the respiration of which is stimulated by the bath, and by the exercise in the open air invariably indulged in afterward.

There are many kinds of medicated baths, which have, or are supposed to have, special properties, valuable for diseased conditions, because of containing various saline substances dissolved in them. Such baths may be artificially prepared by the addition of the salts to the water, or natural mineral waters may be used for the purpose. Mud-baths are recommended for special reasons.

Various arrangements are employed for accentuating the effect of the water, whether used hot or cold, or for applying it to particular parts of the body. The spray is one well-known variety of bath. The douche is a jet of water directed upon some part of the body through a 1½ inch pipe, the force of the water, quantity discharged, and temperature being capable of modification. It at first lowers the vitality of the part to which it is applied, but reaction sets in quickly, so that its whole effect is stimulating, quickening tissue change. The douche may be used hot or cold, or one after the other in rapid succession, a change which is most stimulating of all. In old-standing complaints, thickenings about joints, stiff joints, etc., it is a very useful application. In the case of the descending douche, the pipe is 10 to 15 feet above the floor level, and for the horizontal douche the pipe is 4 feet above floor level. In the former case it is played first on the spine, and then shoulders, hips, arms and legs in succession. At the close it is directed on to the chest and head, the force of the water being broken by the hands. In the latter case the back, chest, arms, and legs are douched in the order named, while the patient rubs himself vigorously. Before beginning the head is wet with cold water, and is douched last, the force of the water being broken. The process should last scarcely two minutes.

The sitz-bath or hip-bath is a means of limiting the application of the water to the hips and neighboring parts. The form of the bathing-tub is such that the person has the bath in the sitting posture, the limbs and upper part of the body being out of the bath. The sitz-bath, hot or cold according to circumstances, is in much use for abdominal and liver complaints, and specially for feminine ailments. Its soothing effects used hot in such disorders are marked. Altogether the use of the bath, in association with treatment by medicine, is of the highest value in numerous disorders, rheumatic, gouty, digestive, uricæ, etc. In particular, the Turkish bath, under due superintendence, may produce surprising results, from checking a simple cold upward. See also HYDROTHERAPY.

Bath Brick, or **Bristol Brick**, an artificially manufactured brick, of the usual form, but formed of calcareous earth. It is used for cleaning various kinds of metal work, and in England is manufactured from the silt left in the river Parret in Somersetshire after high tides.

BATH BUN—BATH, HISTORY OF THE

Bath Bun, an English bun, or sweetened cake or biscuit, made generally without currants.

Bath Chair, a small carriage or chair on wheels, drawn by a chairman, and intended for the conveyance of individuals or others for short distances. It is so called because either originally or principally used at Bath, where the steepness of many of the streets rendered such conveyances especially useful.

Bath, History of the. As the most ancient records of the human race refer to the use of the bath it is probably safe to surmise that the prehistoric peoples early discovered the cleansing effect of water and were eager to enjoy it. To the ancient Egyptians, as to the more modern Mohammedans, it is a part of their religious service, while among the early Hebrews it was not only one of the first purificative duties but it was positively prescribed by the Mosaic law in certain specified cases of uncleanness. Thus the Jew who had no bath in the court yard of his house, bathed in the streams, or, later, in the mixed, or public baths, while, besides water, bran was often used for ceremonial cleansing, especially by the women, just as the modern Arabs, when unable to obtain water, rub themselves clean with sand.

The earliest and most common form of bathing was, of course, that of swimming in rivers, and bathing in such rivers as the Nile and the Ganges was supposed to possess a religious significance which tended to make the practice a very popular one. The use of oils and the greater luxury of perfumes became customary on occasions of sanitary bathing at a very early period. In later times the more wealthy Romans possessed many kinds of oils and pomades which they brought to the baths, that their bodies might be anointed with them, while even the poorest classes rubbed their bodies with flour of lentils after the bath.

The first reference to such a convenience as that of a public bath occurs in the Bible, where it is stated that the bathing "pools" were sometimes sheltered by porticoes, but this was a simple invention when compared to the perfect bathing facilities which were afterward provided by the Greeks and Romans, while the praise lavished upon the baths of Darius by Alexander the Great indicates that the Persians must also have possessed beautifully appointed bathing facilities.

The public baths, which began to be built in Rome shortly after Clodius had succeeded in supplying the city with water from Praeneste, soon became one of the most popular institutions of the nation and emperors vied with their predecessors to construct the largest and most elaborate establishments. As the result, enormous buildings were erected and these contained not only the bathing apartments but the gymnasium and libraries, or even theatres, and the most able writers of that time admit their inability to describe the magnificence and luxurious appointment of many of these palaces of cleanliness and pleasure. For example, Seneca says, "To such a pitch of luxury have we come that we are dissatisfied if we do not tread on gems in our baths." These baths, or *thermae*,

as they were called, contained swimming baths, warm baths, vapor baths, and baths of hot and cold air.

Wherever the Romans settled they built public baths, and wherever they found hot springs or natural *stufæ*, they made use of them, thus saving the expense of heating, as at Baiae and Bath. The charge made at a public bath was only a *quadraus*, or about one quarter cent.

The delicacy of feeling concerning the bathing together of sexes which is said to have existed in early times certainly did not extend to the days of the Empire, when it was not at all uncommon for men and women to make use of the same bath and it was probably due to this practice that the public baths came to be condemned by the early Christians as places of unbounded license. While admitting the usefulness of the bath from the standpoint of cleanliness and health, the Church fathers insisted that baths should be taken for such purposes only and not for pleasure. It was at this time when the bath reached the height of luxuriousness; when rich citizens had magnificent private baths of their own attached to their villas, and when elaborate private bathing houses might be had for hire in all the cities; conditions which continued until about the 5th century, when the destruction of Rome's water supply by the Huns and the many disasters which accompanied the downfall of the Empire tended to turn popular attention from the delights of the *thermae*. How thoroughly the bath afterward fell into disuse, however, is a matter which historians have been unable to determine. In the East, of course, where the heat and dust make its use obligatory, there has never been any diminution in the practice, and while in Europe, for a time at least, perfumes were used to offset any disagreeable odors that might arise from uncleanness of the person, this condition could not have existed for many centuries, for, by the latter part of the 12th century, the popularity of the bath had become so well re-established that there was scarcely any large city in Europe which did not possess well patronized hot air bathing houses. Again in the 17th century, when the Turkish bath was introduced, there was another revival of interest in the matter of personal cleanliness, and people of all classes flocked to the baths, or *Hammams*, as they were called, to enjoy the new luxury that had been imported from the East.

While the Turkish bath, not to mention the Russian and Egyptian baths, are so similar to the hot air baths of the Romans that many authorities have regarded them as nothing more or less than an outgrowth from the latter, the fact that the principle of the vapor bath has been known to many nations, and has even been found among savages, or races in an early stage of civilization, has led to the more recent and counter theory that the hot air boxes of the Mexicans, the "medicine sweats" of the American Indians, the small baths of the ancient inhabitants of Scotland and Ireland, and the larger vapor baths of Japan, like those of Turkey and Russia, are of just as independent origin as those of the more ancient Rome. However that may be it is at least certain that, while this luxurious form of bathing was largely responsible for the neglect of the cold

BATH BUN—BATH HOUSES

bath and the sea-bathing, the virtues of which have been appreciated only within comparatively modern times, it is largely due to the pleasurable sensations resulting from this form of bath that the various nations of the world have not neglected those principles of cleanliness upon which the good health of a people so vitally depends.

J. R. MEADER,
Editor of 'American Year Book'

Bath Houses, Public. The public bath-house was a matter of course in the cities of southern Europe down to the end of the Roman empire; one of the chief objects of public expenditure and private munificence. The Romans borrowed it from the Greeks, but vastly improved it, connecting it with a general system of public recreation. Mæcenas under Augustus was the first private citizen to build a splendid specimen and give it to the city of Rome; and after him each succeeding emperor strove to outdo the others in enormous buildings of magnificent architecture and sumptuous fittings, containing not only all kinds of baths,—cold, hot, swimming, vapor, hot air, and shower,—but gymnasia, theatres, and libraries. Private persons also founded them in provincial cities. But after the barbarian deluge, both money and water supply failed, and till very modern times general cleanliness ceased to be a municipal concern. The system first revived in Germany, but only in cold swimming baths; the first enclosed bath houses with hot and cold water were established in Liverpool, in 1842. The movement spread but tardily in Great Britain,—the first legislation of 1846 being little acted on,—till about 1890, when city councils began to take it up energetically with authorization from Parliament; but it then increased so rapidly that almost every town or borough of 50,000 people now has its public bath open the year round, as do very many smaller ones. In Germany about 50 cities have them. On the Continent generally and in Scandinavia, only the large cities are thus provided; but in Russia they are almost universal in places of any size.

In the United States, though public baths have existed for some 40 years in a few great water-side cities, they were till a few years ago confined to cold swimming-baths sunk in the sea or river near the shore, and open only during warm weather; of excellent service for the comfort of those not too far off, but too limited in scope to be of the highest value to the general public. Not only were they closed for more than half the year, but to those who must walk more than half or three quarters of a mile to obtain a bath (their utility being for the poor), their value as refreshment in hot weather was neutralized by the needful exertion to reach them. Their use, therefore, depended on their distribution and relation to the water system. Thus, in Boston, where six were established in 1866, with 300,000 patrons during the first season, and extended to 14 in 1897, they were so located on the Charles River, at City Point, and on South Bay, that a considerable part of the poorer population were within fairly easy distance of them. Only about a dozen United States cities, however, had even these bathing facilities till a few years since, and the first general movement in favor of year-round hot and cold baths was a reflex from Germany,

about 1891. In that year the People's Baths were built in New York by a private philanthropic association, and maintained by a small fee; and in 1893 Chicago opened a small municipal bath house. The first compulsory legislation was by New York state in April 1895 (though a bathing and washing association was incorporated there in 1849), it obliged all cities of over 50,000 people to establish public baths and comfort stations, kept open the year round, with both hot and cold water, and 14 hours a day, and under such conditions as the local board of health judged proper, river, lake, or sea baths not to be deemed a compliance with the act. Cities under 50,000, though not compelled, were permitted to use their funds or credit for the same object. The first city to comply, and perhaps the first in the United States to furnish such conveniences in their full extent, was Yonkers, N. Y., not within the compulsory section. This town opened one on Labor Day, 1896; and another of brick, fire-proof, in 1898, with accommodations for 400 daily baths. Within the act, Buffalo opened its first in 1897; Albany, Rochester, Syracuse, and Troy, have since complied; and in New York the first one, five years after the act was passed, was opened in Rivington Street in a closely packed quarter, during 1900, at a cost of \$100,000. It furnishes 3,000 baths a day of 20 minutes each, from 67 spray baths. In Philadelphia the Public Baths Association was organized in 1895; but the first to be opened was in 1898, in a crowded quarter between Fourth and Fifth streets. It is a building of 2½ stories, 40 by 60, constructed of brick and iron, with concrete floors and iron partitions. It cost about \$30,000. It has no swimming pool, but only shower baths—a system rapidly coming into favor from its economy of space and water; the People's Baths and the Baron de Hirsch Fund Baths in New York adopt the same plan. The Philadelphia establishment has a public laundry in connection with its own suit and towel laundry, where women and men in separate compartments can wash their clothing for a small fee, and single men make much use of it to wash their underclothing. Pittsburg, Pa., has recently erected a permanent public bath. Some of the old warm-season baths have since been made permanent, as in Newark, N. J., which so extended two in 1898, and in 1900 voted a third. Boston from 1897 to 1899 increased its public baths to 33—14 floating, 10 beach, and 9 others; 17 south of the common and 16 north; and prepared to erect permanent structures in each industrial section of the city. The first of these was opened at Dover Street in 1898—a fine brick and granite structure, with marble partitions and staircases, the whole with land costing \$86,000. It has gymnasiums also, and medical directors for each sex to give courses of training, and for cases of accident or sudden illness. The intention is ultimately to make these baths places of public recreation, corresponding to the summer playgrounds; thus reaching in the 20th century the point at which the Romans had arrived in the first. Brookline, adjoining Boston, has a handsomely appointed permanent municipal bath house and so have Worcester, Mass., and Providence, R. I. St. Paul, Minn., through the public spirit of Dr. Ohage, a German physician, now has a public playground, pavilion, etc., connected with permanent bath

BATH METAL — BATHOS

houses on what was till recently a waste island in the middle of the Mississippi, near the business centre of the city and between two main bridges. Like most of the other bath establishments, it is free, save a small charge for soap and towels; has free instruction in swimming, and is open every day, including Sundays. The donor calls it an experiment in municipal socialism, being himself a socialist. A very recent phase of the movement is the connection of the system with the public schools. It began in Germany, Göttingen leading the way in 1885 under the leadership of the mayor and a professor in the university. Thus far, in the United States it is nearly confined to Boston and its suburbs; in 1900 a number of baths were put into the Paul Revere school in the North End, and in Brookline swimming is a regular part of the school curriculum. As a means of public sanitation, preventing the spread of disease and purifying the air, where the rooms are full of children from the poorer quarters, it has much to commend it.

Bath Metal (from Bath, England), a light-colored brass, containing 55 per cent of copper and 45 per cent of zinc. Other white brasses are called by the same name, however.

Bath, Knights of the, an English order, concerning the origin of which antiquaries differ. Henry IV., on the day of his coronation, conferred the degree upon 40 knights. From that time the kings of England have bestowed this dignity previous to coronations, after births and marriages of the royal issue, etc. Charles II created several Knights of the Bath, but after his time the order fell into neglect, till 1725, when George I. revived it. By the book of statutes then prepared, the number of knights was fixed at 38, namely, the sovereign, and 37 knights companions. The king allowed the chapel of Henry VII., in Westminster Abbey, to be the chapel of the order. The limits of the order were greatly extended by the prince regent in 1815, to reward the distinguished services of officers during the wars; and again in 1847, when it was also opened to civilians. It was further enlarged in 1861. It now consists of three classes, each of which is subdivided into (1) military members; (2) civil members, and (3) honorary members, consisting of foreign princes and officers. The first class consists of Knights Grand Cross (G.C.B.); the second of Knights Commanders (K.C.B.); and the third, of Companions (C.B.). The dean of Westminster is dean of the order. The ribbon of the order is crimson, and its motto, "Tria juncta in uno." The name is conjecturally derived from the initiatory ceremony of bathing once practised at the installation of a knight, as symbolical of the purity thereafter required of him.

Bath-stone, one of the three kinds of oolitic limestone which is extensively used in building, and is so called from being found in the neighborhood of Bath, England. This member of the oolite formation has been called the great oolite, and it is of considerable thickness. When just quarried it is soft, but soon becomes hard on exposure to the atmosphere. English churches built of it eight centuries ago are still in a good state of preservation.

Bathgate, a town in Linlithgowshire, Scotland, 17 miles southwest of Edinburgh. Its

older portion is situated on a sharp slope, but the Moslem quarter is more level. There are paraffin and paper works, but mining is the chief industry. A charter was granted to the town by Charles II in 1668. A noted gas coal called Torbanehill mineral is found here. Pop. (1901) 6,786.

Bathom'eter, an instrument for measuring the depth of sea beneath a vessel without casting a line. It is based upon the fact that the attraction exerted upon any given mass of matter on the ship is less when she is afloat than ashore, because of the less density of sea water as compared with that of earth or rock.

Bathori, ba'tō-rē, or **Battori**, a celebrated Hungarian family which in the 15th century became divided into two branches, one of which gave Transylvania five princes, and Poland one of its greatest kings.

1. **STEPHEN** b. 1532; d. Grodno, 1586. He entered the army, and so distinguished himself that when the death of John Sigismund Zapolya, nephew of Sigismund II., king of Poland, in 1571, left a vacancy in the sovereignty of Transylvania, Stephen Bathori, without courting the honor, was unanimously elected. When the throne of Poland became vacant by Henry of Valois quitting the country in order to mount the throne of France, Stephen Bathori was elected to succeed him in 1575, and was crowned along with his queen, Anne, daughter of Sigismund Augustus, at Cracow, in 1576. He found the kingdom torn asunder by faction, the people enervated by long peace, the treasury exhausted, and the army without discipline. He therefore gave his first attention to internal improvement, but had no sooner effected it than he determined to recover the Polish territories of which the czar of Muscovy had managed to possess himself by fomenting dissensions. He accordingly declared war against him, beat him at all points, and compelled him to accept a disadvantageous peace. Under Stephen Bathori, Poland enjoyed a comparative tranquillity to which it had long been a stranger, and he was meditating important constitutional reforms, which promised to make that tranquillity permanent, when he died suddenly.

2. **SIGISMUND**, nephew of Stephen, d. 1613. He became waiwode or prince of Transylvania in 1581, shook off the Ottoman yoke, and, by the great talents he displayed, had begun to give hopes of reigning gloriously as an independent sovereign, when, from mere fickleness and eccentricity of character, he voluntarily resigned his dominions to the Emperor Rudolph II. in return for two principalities in Silesia, a cardinal's hat, and a pension. With the same fickleness, however, he immediately repented of the act, and, availing himself of an invitation by the Transylvanians, returned, and placed himself under the protection of the Porte. The talent which he had displayed, and the good fortune which had followed him in early life, appeared now to have forsaken him; the Imperialists defeated him in every battle, and he was obliged to throw himself on the mercy of the emperor, who sent him to live out the rest of his days at Prague.

Ba'thos, a Greek word meaning depth, now used to signify a ludicrous sinking from the sublime to the mean in poetry. This application of the word was introduced by Swift, who, in his 'Art of Sinking in Poetry,' opposes bathos to the sublime.

BATHS OF AGRIPPA—BATHYMETRY

Baths of Agrippa, the earliest of the Roman thermæ; erected by Marcus Agrippa in the reign of Augustus. It stood in the Campus Martius, about 20 feet behind the Pantheon. In 1881, on the removal of some houses, ruins were found of a great hall paved with marble and lined with fluted columns.

Baths of Caracalla, one of the most magnificent of the Roman thermæ, in the southeast part of the city, in which 2,300 men could bathe at the same time. It was begun in 206 A.D. by Caracalla, and completed by Severus. There were stadia for the athletes, galleries for the exhibition of paintings and sculpture, libraries, conversation halls, lecture-rooms, etc. The mechanical skill displayed in its construction was very great. The ruins which still remain are among the most remarkable in Rome. Many masterpieces were found here.

Baths of Diocletian, the most extensive of the Roman thermæ; in the northeast part of the city, and covering most of the ground between the Porta Collina and the Porta Viminalis. Over 3,000 persons could bathe in it at the same time. It contained a library, picture-gallery, odeum, etc. Michael Angelo transformed the great hall of the Tepidarium into a nave for the Church of S. Marie degli Angeli. One of the *laconica* (hot rooms) forms the vestibule of the church.

Baths of Titus, a structure on the Esquiline Hill in Rome; built by the Emperor Titus. Considerable ruins are found northeast of the Coliseum.

Bathsheba, bāth-shē'ba, or bāth'shē-ba, wife of Uriah, the Hittite, whose story is told in 2 Sam xi. David committed adultery with her, then caused her husband to be slain, and afterward took her to wife. These sins displeased Jehovah, who sent the prophet Nathan to David with the parable of the ewe lamb. David bitterly repented, but yet was punished. Bathsheba was the mother of Solomon, whose succession to the throne she took pains to secure. She is afterward mentioned in the history of Adonijah, in the title of Psalms li., and among the ancestors of Christ (Matt. i. 6).

Bathurst, Allen, (EARL), English statesman: b. 1684; d. 1775. He was a zealous opponent of the measures of Sir Robert Walpole's ministry, and the intimate friend of Bolingbroke, Pope, Addison, and other great writers of the time.

Bathurst, Henry (2d EARL), son of the preceding, English statesman: b. 1714; d. 1794. In 1771 he was made lord high chancellor of England. He wrote 'Theory of Evidence,' etc.

Bathurst, Henry (3d EARL), son of the second earl, English statesman: b. 22 May 1762; d. 1834. In 1807 he became president of the board of trade; in 1809 secretary for foreign affairs; and in 1812 secretary for the colonies, a post held by him for 16 years. He was also president of the council under Wellington, 1828-30.

Bathurst, Ralph, English clergyman: b. 1620; d. 14 June 1704. He was dean of Wells, and wrote some elegant Latin poems, and was one of the founders of the Royal Society of London (q.v.), which was incorporated in 1660.

Bathurst, Africa, a town on the island of St. Mary's, near the mouth of the Gambia, and capital of the British colony Gambia. Its trade

is chiefly in gum, bees'-wax, ground-nuts, hides, ivory, and gold, bartered for cloths and cutlery. Pop. 6,000.

Bathurst, Australia, the principal town in the western district of the colony of New South Wales, on the south bank of the Macquarie River, 144 miles west of Sydney, 2,153 feet above sea-level, and surrounded by hills. It has wide, well-laid-out streets crossing each other at right angles, with a central square planted with trees. The public buildings include the Anglican and Roman Catholic cathedrals, and churches for the Baptists, Congregationalists, Wesleyans, Presbyterians, and others; court-house, jail, and town-hall, post and telegraph offices; a hospital, numerous schools, a school of arts, etc. There are several tanneries, a coach factory, railway workshops, breweries, and flour mills. Soap, candles, glue, boots and shoes, and furniture are also extensively manufactured. Pop. (1900) 9,069.

Bathurst Inlet, an inlet of the Polar Sea, projecting due south about 75 miles out of Coronation Gulf. It is in a direct line between the magnetic pole and Great Slave Lake, and about 300 miles from each.

Bathurst Island, the name of two islands: (1) An island off the northeast coast of Australia, just west of Melville Island, and separated from the mainland of Australia by Clarence Strait on the south, and from Melville Island by Apsley Strait. (2) an island in the Arctic Ocean, discovered by Parry in 1819, lying due south of Grinnell Land, and the most eastern of the group called Parry Islands. It is separated from North Somerset on the south by Barrow Strait, and from North Devon on the east by Wellington Channel.

Bathybius, the name given by Huxley, in 1868, to a supposed organism, a bit of unorganized protoplasm, found at the sea-bottom at great depths. It was structureless, and contained numerous calcareous concretions. Huxley abandoned the idea that it was a living organism. Afterward Bessels gave the name "protobathybius" to a similar slimy moss dredged in Smith's Sound in 92 fathoms, possibly the remains of protozoa or sponges. Bathybius was not rediscovered by the Challenger expedition, and Sir John Murray suspected that the substance was only a gelatinous precipitate of sulphate of lime from sea water mixed with alcohol.

Bathycles, Greek artist, supposed to have flourished in the time of Solon, in the 7th century B.C. He was a resident of Magnesia, in Thessaly, on the Mæander, and constructed for the Lacedæmonians the colossal throne of the Amyclæan Apollo, at Amyclæ, near Sparta. Quatremère de Quincy, in his 'Jupiter Olympien,' has given an interesting view of the splendid god and his superb throne, designed from the description of Pausanias.

Bathymetry, the art of measuring depths in the sea, especially for the purpose of investigating the vertical range of distribution of plants and animals. An extensive series of such bathymetric measurements was made by H. M. S. Challenger (1872-6), the deepest sounding being 4,575 fathoms. In February 1900 the United States surveying ship Nero reported that in surveying for a proposed telegraphic cable line between Honolulu and Manila by way

BATISTE — BATONI

of Guam and Yokohama, she encountered the greatest ocean depths on record; two casts showing 5,160 and 5,269 fathoms respectively

Batiste, ba-těst, a fine, white, very compact linen, distinguished by its delicate, firm, and uniform threads from every other linen texture. The name is derived either from the Indian material *bastas*, or from one of the early manufacturers of it, Baptiste Chambray, who lived in the 13th century, and from whom it was also called the cloth of Chambray, or Cambray; hence the English word cambric.

Batjan, băt-yan', one of the Molucca Islands, lying southwest of Gilolo. It is governed by a native sultan under Dutch suzerainty. The chief industry is the cultivation of spices. Area, 835 square miles; population from 12,000 to 13,000, of which the majority are Malays or Alfoces.

Batley, England, a municipal and parliamentary borough, in the West Riding of York, eight miles south of Leeds, and just north of Dewsbury, with which it is united for parliamentary purposes. The houses are chiefly of stone, and rather irregularly built. Batley has an ancient parish church in the Early English style, a town-hall, a grammar and a technical school, mechanics' institute, etc. The principal manufactures are heavy woollen cloths, Batley being the chief seat of the manufacture of heavy woollens. There are also iron foundries, machine-works, collieries, etc. Pop (1901) 30,300

Battle, bat-le, **Lorenzo**, Uruguayan statesman: b. Montevideo, 1812. He commanded a body of infantry in the nine years' siege of Montevideo, was minister of war in 1866-8; president of the republic from 1868 to 1872, when he resigned the office and resumed his place as general in the army.

Batna, bat'na, Algeria, a town of the department of Constantine, situated at the foot of Mount Tugurt. It is an important military and trading post. Pop 8,381.

Baton, băt-on, or ba-tôn, a short staff or truncheon, in some cases used as an official badge, as that of a field marshal. The conductor of an orchestra has a baton for the purpose of directing the performers as to time, etc. In heraldry, what is usually called the bastard bar, or bar sinister, is properly a baton sinister.

Baton Rouge, La., city, parish-seat of East Baton Rouge, and capital of the State. The name is derived from the French, meaning red baton or stick. The city is situated on the eastern bank of the Mississippi River, 90 miles northwest of New Orleans, and is on the Texas and Pacific and the Yazoo and Mississippi Valley Railroad. It is picturesquely built on a bluff commanding an excellent view of the surrounding country. The houses are mostly of French and Spanish architecture. The river below the city is bordered by sugar-cane plantations, orchards of tropical fruits, private gardens, and villas. It was the capital of the State from 1847 to 1864, when the seat of government was removed to New Orleans. On 1 March 1882, Baton Rouge was again selected as the capital city. The State capital building here was completed in 1852 at a cost of \$246,000. It was partially burned during the Civil War but was rebuilt in 1882. The Louisiana State University

was organized here in 1860. The city also contains various State institutions, orphan asylum, penitentiary, deaf and dumb, and blind asylums, State agricultural and mechanical college, and agricultural experiment station. There are among other public buildings, the Court House, City Hall, Post Office, Collegiate Institute, High School building, and a National Soldiers' Cemetery.

There are varied and extensive manufacturing interests, including cotton seed products, lumber, sugar, molasses, brick, artificial ice, and agricultural implements. The city has National and State banks, several daily and weekly newspapers. There is a large and growing trade with the surrounding cotton and sugar growing regions. The city has a real property assessed valuation of \$2,000,000, actual valuation \$3,500,000, exclusive of the valuable City, Parish and State property which is exempt from assessment. In addition to above the personal assessed property is \$1,000,000, making a total assessment of \$3,000,000, real value \$5,000,000.

Baton Rouge is governed under a charter of 1898, by a mayor, elected every four years and a city council, elected every four years. A majority of the municipal officers are selected by the council. The city was one of the earliest French settlements in Louisiana. A convention which met here 21 Jan 1861, adopted the ordinance of secession on the 26th; the city was taken by the Federal army 7 May 1862. On 5 August the same year a Confederate force numbering 5,000 under command of General John C. Breckenridge, attacked the Federal garrison under General Thomas Williams, but was repulsed after a fierce contest lasting two hours. Gen Williams was killed and both sides lost heavily. The city was shortly afterward evacuated but a month later was re-occupied by the Federal troops who remained until the close of the war. A former government arsenal here was destroyed during the war. Baton Rouge had a population in 1870 of 6,498; (1880) 7,197; (1890) 10,478; (1900) 11,269. The estimated population in 1903 was 12,500.

W. H. BYNUM,

Mayor of Baton Rouge.

Batonapa, ba-tō-na'pa, Mexico, a hill in the province of Sonora, near the town of Banamichi on the Sonora River. It is covered with ruins of Indian fortifications, built in ancient times by the Opatas, as a refuge in case of attack.

Batoni, ba-tō'nē, **Pompeo Girolamo**, Italian painter: b. Lucca, 1708; d. Rome, 1787. The manner in which he executed his paintings was peculiar. He covered his sketch with a cloth, and began to paint the upper part on the left hand, and proceeded gradually toward the right, never uncovering a new place until the first was entirely finished. Boni who compares him with Mengs, calls the latter the painter of philosophy; the former, the painter of nature. Batoni painted many altar-pieces and numerous portraits, including those of the Emperor Joseph and the Empress Maria Theresa in the imperial gallery. His greatest work is his 'Fall of Simon the Sorcerer,' which was ordered by Cardinal Albani for the church of St. Peter's at Rome, and was intended to be executed in mosaic. His 'Magdalene,' in Dresden, and his 'Return of the Prodigal Son,' in Vienna, are also celebrated.

BATTA—BATTERING RAM

Bat'ta, Africa, a province of the Congo Free State, formerly independent. Its principal towns are Batta and Cango.

Batta, Sumatra, a district in the northern part of the island, stretching between Sinkell and Tabuyong, on the west, and the Bila and the Rakan on the east. The soil is fertile, and produces chiefly camphor, gum, benzoin, cassia, cotton, and indigo. The language of the Battas is a settled one, and extensively written. Bark or bamboo staves are used in place of books, being written on from bottom to top. Their literature consists chiefly of tales of witchcraft, riddles, stories, etc. There are three dialects. Pop. about 300,000.

Battalion, the tactical unit of command in infantry—that is, the first body that is, as a rule, used independently, and commanded by a field officer (major or lieutenant-colonel). In the United States army eight companies of cavalry and artillery and 10 of infantry constitute a battalion; each infantry regiment has one battalion and those in the cavalry and artillery have two.

English battalions are formed of 10 companies for administrative, and eight for tactical purposes. The first 25 regiments have two battalions, the remainder, originally of one battalion each, are linked in pairs according to their territorial derivation. Linked battalions are interchangeable as regards officers, and each shares the honors and advantages of the other. Two regiments of rifles have four battalions each, and the three regiments of the Guards seven battalions in all. The peace strength of a battalion is about 400 men, but varies; its war strength in the field is 1,000, with one lieutenant-colonel, two majors, eight captains, 16 subalterns, four officers of the regimental staff (adjutant, paymaster, quartermaster, and medical officer), and 50 sergeants. The corporals and lance-corporals fall in with the privates in the ranks, and therefore number among the rank and file.

The French infantry is divided into (1) infantry of the line; (2) regiments of zouaves; (3) regiments of *tirailleurs Algériens*; and (4) battalions of *chasseurs à pied*. The 144 regiments of infantry of the line have each four battalions; a battalion (which is divided into four field companies), consisting of 12 commissioned officers, 54 non-commissioned officers, and 264 soldiers—in all 330 men, raised in time of war to 1,000. The regiments of zouaves have in peace 612 men in a battalion, and in war 1,000. The *tirailleurs Algériens*, who in time of peace are stationed in Algeria, have in peace 652 men in a battalion, and in war 1,000. Finally, the *chasseurs à pied* have in peace 468 men, and in war 1,000.

In Germany, with the exception of the 116th (Hesse) regiment, the 148 line regiments have three battalions. The yagers are formed into 26 separate battalions. To each line regiment is attached a landwehr regiment of two battalions, and these latter bear the same number as the regular regiments to which they are affiliated. The five Prussian Guard regiments have 22 officers and 678 men per battalion in peace time, the remaining regiments having 18 officers and 526 men per battalion, and the yagers 22 officers and 526 men. On mobilization for war all battalions are raised to a

strength of 22 officers and 1,000 men, with a regimental staff of one commandant, one extra field officer, and one aide-de-camp. Pioneer battalions are practically field engineer bodies, and are divided into pontoniers (for bridging), and sappers and miners (for siege operations, demolition or construction of artificial defenses). They have each three field and one depot company; the former comprising 15 officers and 650 men.

Battenberg, bät'en-bärg, **Alexander**, Prince of, Bulgarian ruler: b. 1857; d. 17 Feb. 1893. He was the second son of themorganatic union between Prince Alexander of Hesse and the Countess von Hauke, who in 1851 received the title of Countess of Battenberg. In 1879 he was chosen Prince of Bulgaria, and in 1885, without consulting Russia, proclaimed the union of eastern Rumelia with Bulgaria. This action exasperated both Russia and Serbia, and the latter took up arms against Bulgaria, but was easily defeated by Alexander in the space of two weeks. In August 1886, however, Russian partisans overpowered Alexander in his palace at Sofia, forced him to abdicate, and carried him off to Reni, in Russian territory. Set free in a few days, he returned; but after a futile attempt to conciliate the czar he abdicated in September, and, assuming the title of Count Hartenau, retired to Darmstadt.

Battenberg, **Henry Maurice**, British soldier: b. Milan, 5 Oct. 1858; d. 20 Jan. 1896. He was the third son of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), and in 1885 married the Princess Beatrice of England, youngest daughter of Queen Victoria. He joined the British expedition of 1895 against Ashanti, and while on his way home died at sea of a fever contracted during his military service.

Battenberg, **Louis Alexander**, British naval officer b. Gratz, 24 May 1854. He was the eldest son of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), and in 1884 married the eldest daughter of the Princess Alice Maud Mary, grand duchess of Hesse-Darmstadt, and second daughter of Queen Victoria.

Battenberg, a village in the Prussian province of Hesse-Nassau, from which the sons of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), derive their title of princes of Battenberg.

Battens, pieces of timber of different lengths, used for making floors, and also, after being divided so as to be $2\frac{1}{4}$ inches wide and $1\frac{1}{4}$ thick, placed against walls to separate the laths on which plastering is to be put from the walls. In nautical affairs, battens are (1) strips of wood nailed down over the tarpaulins which cover the hatches; (2) similar strips fastened to portions of the rigging to prevent injury from chafing; (3) light frameworks placed on dining tables to keep the dishes from sliding off by reason of the ship's motion, also called fiddles; (4) thin strips of wood placed in pockets on the leach of a sail to prevent wrinkling or bagging.

Battering Ram (Lat. *aries*), the earliest, simplest, and, until the improved usage of artillery, the most effective machine for destroying stone walls and the ordinary defenses

BATTERSEA — BATTERY

of fortified towns. Its primitive form was a huge beam of seasoned and tough wood, hoisted on the shoulders of men; who, running with it, at speed, against the obstacle, wall, gate, or palisade, made what impression they might against it. The ancients employed two different machines of this kind—the one suspended, and vibrating after the manner of a pendulum, and the other movable on rollers. The swinging ram resembled in magnitude and form the mast of a large vessel, suspended horizontally at its centre of gravity, by chains or cords, from a movable frame. Ligatures of waxed cord surrounded the beam at short intervals, and cords at the extremity, opposite to the head, served for the purpose of applying human force to give the oscillatory motion. Other cords, at intermediate distances, were also sometimes employed. The rolling ram was much the same as the above in its general construction, except that instead of a pendulous motion, it received only a motion of simple alternation, produced by the strength of men applied to cords passing over pulleys. This construction seems to have been first employed at the siege of Byzantium. These machines were often extremely ponderous. Appian declares that, at the siege of Carthage, he saw two rams so colossal that 100 men were employed in working each. Vitruvius affirms that the beam was often from 100 to 120 feet in length, and Justus Lipsius describes some as 180 feet long, and two feet four inches in diameter, with an iron head weighing at least a ton and a half. In contrasting the effects of the battering-ram with those of the modern artillery, we must not judge of them merely by the measure of their respective momenta. Such a ram as one of those described by Lipsius would weigh more than 45,000 pounds, and its momentum, supposing its velocity be about two yards per second, would be nearly quadruple the momentum of a 40-pound ball moving with a velocity of 1,600 feet per second. But the operation of the two upon a wall would be very different. The ball would probably penetrate the opposing substance, and pursue its way for some distance; but the efficacy of the ram would depend almost entirely upon duly apportioning its intervals of oscillation. At first it would produce no obvious effect upon the wall, but the judicious repetition of its blows would, in a short time, give motion to the wall itself. There would first be a barely perceptible tremor, then more extensive vibrations, these being evident, the assailants would adjust the oscillations of the ram to that of the wall, till at length a large portion of it, partaking of the vibratory impulse, would, by a well-timed blow, fall to the earth at once. This recorded effect of the ram has nothing analogous in the results of modern artillery.

Battersea, a district of London, in Surrey, forming, with Clapham, a parliamentary borough, on the right bank of the Thames, across which there is communication by several bridges. There is a fine public park in Battersea, extending over 185 acres, and containing a considerable sheet of water. There is a Church of England training college for schoolmasters and a Wesleyan for schoolmistresses. Clapham and Wandsworth Commons are fine areas of unenclosed ground. Battersea

and Clapham send two members to Parliament—one for each division. Battersea parish is a borough under the London Government Act (1899).

Battershall, Jesse Park, American chemist: b. Troy, N. Y., 26 May 1851; d. Poughkeepsie, N. Y., 12 Jan. 1891. He studied chemistry at the Columbia School of Mines, Gottingen, Leipsic, Geneva, and Tubingen. In 1879 he became head of the analytical department of the United States laboratory in New York, a position held until his death. He has published a translation of Naquet's 'Legal Chemistry' (1876); 'Food Adulteration and Detection' (1887).

Batterson, Hermon Griswold, American clergyman b. Marbledale, Conn., 28 May 1827; d. New York, March 1903. He was ordained to the ministry of the Protestant Episcopal Church in 1866, and held rectorships in San Antonio, Texas, Wabasha, Minn., Philadelphia, and Church of the Redeemer, New York, 1891. He published 'Missionary Tune Book' (1868); 'Christmas Carols, and Other Verses' (1877); 'Sketchbook of the American Episcopate' (1878, 2d ed 1884); 'Pathway of Faith'; 'Vesper Bells'.

Batterson, James Goodwin: b. Bloomfield, Conn., 23 Feb. 1823; d. Hartford, Conn., 18 Sept. 1901. He was educated in the public schools of Litchfield, Conn., and in 1845 became an importer of and dealer in granite and marble, with headquarters in Hartford. His business grew into one of the most extensive of its kind in the United States, controlling large granite quarries in Westerly, R. I. He took important contracts for public and private buildings and supplied the stone for the State capitol and Connecticut Mutual buildings in Hartford, the Mutual Life, Equitable Life Insurance Companies' buildings, and Vanderbilt residence in New York. He was the first to use machinery for polishing granite and devised many other improvements. In 1863 he founded the Travelers' Insurance Company, and was its president until his death. Throughout his life, though never holding political office, he was one of the foremost public figures of his city and State. He was an enthusiastic student of political economy, and wrote numerous articles and pamphlets on the money question. He taught himself Greek and became an acknowledged master of it; and he was equally accomplished in several of the modern European languages, his versatility and capacity for work being extraordinary. In the last year of his life he wrote a poem of some length, 'The Beginnings,' dealing with the origin of the universe and life. Publications: numerous articles in 'The Traveler's Record'; 'Gold and Silver as Currency' (1896).

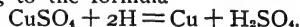
Battery, The, a park of 21 acres forming the southernmost point of New York, occupying the site of the original Dutch fortifications. In the early days of the city the vicinity of the Battery was a very aristocratic quarter, and some of the old houses are still standing. The park now contains the Barge Office and the Aquarium, formerly Castle Garden (q.v.).

BATTERY

Bat'tery, in electricity, an apparatus for the production of voltaic (or dynamic) electricity, by chemical means, or by the direct transformation of heat energy (as in the thermopile). It is admitted that the first electric battery was constructed by the Italian physicist Volta, about the year 1800. Some 20 years before, Galvani, a professor of anatomy at Bologna, had observed the convulsive twitching of frogs' legs, when their muscles and lumbar nerves were simultaneously touched by different metals that were themselves elsewhere in contact, and he had rightly attributed the phenomenon to electricity. Galvani, however, was of the opinion that the electricity was of physiological origin, its seat being within the frogs' legs. Volta, on the contrary, believed that the electricity was generated by the contact of the dissimilar metals, and in this belief he constructed the apparatus which is known as his *couronne de tasses*, or "crown of cups." Placing a series of cups in a circle, he partially filled them with a solution of salt and water, and introduced into each a pair of metallic plates, one of these being zinc, and the other either copper or silver. He connected the zinc plate of each cup with the copper plate of the next, completing the entire circle in this way except at one place, where he attached wires to the terminals, to lead away the electricity generated. Very shortly afterward he constructed the "voltaic pile" on the same general principle, except that he formed it of disks of copper, zinc, and wet cloth, which he piled up in the order copper, zinc, cloth, copper, zinc, cloth, etc., the lowest plate of all being copper, and the highest zinc. The wires for leading off the electricity were then connected at the top and bottom of the apparatus. It is commonly believed that the "pile" of zinc and copper disks was the first form of his battery; but according to Naudet this is an error, the column battery being an afterthought, made with a view to produce an instrument that might be easily transported into hospitals for medical purposes. The phenomena exhibited by Volta's "crown of cups" were remarkable enough to attract the attention of the entire scientific world, and improved forms of battery were soon devised. Cruikshank, Wollaston, Muncke, Young, Faraday, and others contributed in this way, but the most of the changes that were made related to the mode of arranging the plates and other similar details, and, save for the substitution of dilute sulphuric acid for the salt solution, no advance of a fundamental nature was made until 1836, when John Frederick Daniell, an English physicist, invented the battery that bears his name, and which, in some respects, has never been surpassed.

The earlier forms of battery, in which the plates were immersed in a salt solution or in dilute sulphuric acid, gave an electrical current for a short time; but hydrogen gas was deposited upon the copper electrode by the passage of the current, thereby lessening the area of the plate in contact with the liquid, and so increasing the internal resistance of the cell. It was found, too, that the products of decomposition cut down the electromotive force of the cell, by tending to establish an electromotive force in the opposite direction from that in which the battery current first flowed—

a discovery that has since been put to good use in the storage battery (q.v.). To remove the hydrogen film that was deposited upon the copper electrode, various artifices were adopted, such as agitating the solution, or vibrating the copper plate so as to disengage the bubbles of gas and allow them to rise to the surface of the liquid and escape into the air, or rubbing the plate with a brush to achieve the same end, or roughening it in some way so that the hydrogen bubbles would not cling to it so closely. All these methods were troublesome, and it was reserved for Daniell to devise a form of cell in which the hydrogen is removed, automatically and very perfectly, by chemical means. Within the usual containing vessel of glass, he placed a smaller one made of unglazed earthenware, and known as the "porous cup." The outer compartment was filled with dilute sulphuric acid, and contained the zinc plate. The copper plate was placed within the porous cup, and the space around it was filled with crystals of copper sulphate, water or dilute sulphuric acid being added until the liquid stood at the same level on both sides of the porous wall of the cup. When the electric current passes in a battery of this type, the chemical action may be described in the following way. The sulphuric acid, H_2SO_4 , is decomposed into hydrogen, and the radical SO_4 (known as "sulphion"), the sulphion going to the zinc plate, with which it combines to produce zinc sulphate, ZnSO_4 , a salt which dissolves as fast as it is formed, leaving a fresh surface of zinc constantly exposed. The hydrogen of the primary decomposition goes to the copper plate, but instead of being deposited there, as in earlier forms of battery, it combines with the copper sulphate present, reducing it to metallic copper and sulphuric acid, according to the formula



It is evident that the molecule of sulphuric acid that was originally decomposed has now been re-formed again, so that the total quantity of acid present in the cell has not been diminished. The metallic copper that is set free does not interfere in any way with the continued action of the cell, for it is deposited upon an electrode that is already composed of copper. The actual chemical phenomena that occur in the Daniell battery may possibly be more complicated than here indicated, but the final results are the same as those given above.

The valuable feature of the Daniell cell is the remarkable constancy of its electromotive force. In some other respects, however, later forms of battery are superior to it. Thus its electromotive force, although quite constant, is not very great (about 1.07 volts). In 1839 Sir William Robert Grove modified it by substituting strong nitric acid for the solution of copper sulphate, and (since nitric acid will attack copper) platinum plates for the copper ones in Daniell's form. An electromotive force as high as 1.9 volts has been observed with this type of battery, the hydrogen that goes to the platinum electrode being oxidized by the nitric acid, with the formation of nitrous acid and water. The chief objections to Grove's battery are the nitrous fumes that it gives off, and the expense of the platinum required. In 1843 Robert Bunsen found that the latter objection could be readily overcome by

BATTERY

replacing the platinum electrodes by plates of carbon. Except for this substitution, his battery is identical with Grove's, and will give substantially the same electromotive force. It is said that the idea of using carbon instead of platinum occurred to Grove himself, and that he made several public experiments with carbon; but these were not entirely successful, and when Bunsen showed the feasibility of using it, they had been forgotten. Many modifications of the Daniell battery have been proposed. Of these the "gravity battery" is one of the most interesting. It is identical in general theory with the Daniell cell, but contains no porous cup, the liquids being kept separate by their different densities. The copper electrode is placed in the bottom of the cell, and the zinc is suspended near the top. The containing vessel is nearly filled with a solution of copper sulphate, a small quantity of solution of zinc sulphate being floated on the top. The copper sulphate solution, being the denser, remains in the lower part of the cell, and the surface of separation of the two liquids descends, slowly, as the battery is used, owing to the gradual diminution of the quantity of copper sulphate present, and the corresponding increase in the quantity of sulphate of zinc. Gravity batteries, if carefully installed, are quite serviceable, and need but little attention. They are used to a considerable extent for telegraphic purposes, when dynamo-electric currents cannot be had conveniently. Batteries in which the depolarizing agent is a salt of chromic acid are now used very commonly for work in which a large current is wanted for a considerable time. Bichromate of potassium is the salt commonly employed as the depolarizer, its use having been first suggested by Johann Christian Poggendorff, a noted professor of physics at Berlin. Bichromate of potash batteries are made in various forms, some with porous cups and some without. The commoner type has no cup, but consists of zinc and carbon electrodes, immersed in a solution consisting essentially of one ounce of bichromate of potassium and one fluid ounce of concentrated sulphuric acid, to every 10 ounces of water. It is well to add, also, about 1 grain of mercurous sulphate to each ounce of the solution, in order to keep the zincs well amalgamated. A bichromate battery so constructed has an electromotive force of about 2 volts, and can be run on a comparatively low resistance for some time without greatly falling off in its voltage. It is not to be compared for constancy, however, with the batteries of Daniell, Grove, and Bunsen. All the batteries thus far described should have their zincs well amalgamated, by rubbing with dilute sulphuric acid and mercury till a bright, mirror-like surface is obtained. The mercury does not enter into any chemical relations with the other contents of the cell, but it has the power of dissolving zinc in preference to other substances that may be present as impurities in the electrode to which it is applied, and so keeping a fresh surface of the pure metal constantly exposed to the battery liquid.

The sal ammoniac cell invented by M. Georges Leclanché is exceedingly useful for ringing bells, operating telephones, lighting gas jets, and other work where a transient current is desired, though it "runs down" (or loses its

electromotive force) rapidly when used for any considerable time on a closed circuit, recovering again in a short time when left to itself. In its original form it contained a porous cup, in which was a carbon electrode, surrounded by a mixture of pulverized carbon and manganese dioxide. The outer compartment contained the zinc electrode, and the liquid used was a solution of sal ammoniac (ammonium chloride). In recent years the porous cup has been commonly omitted, the depolarizing mixture of carbon and manganese dioxide being compressed into blocks and bound directly to the carbon electrode by means of rubber bands. The electromotive force of the Leclanché cell is about 1.48 volts, when it has been left at rest for some time. In the place of the depolarizing compound given above, a mixture of 55 parts of sulphur, 40 of gas-coke powder, and 5 of shellac is also used. So-called "dry cells" have come into favor greatly during the past few years. These cells are not really dry, except in the sense that they do not contain any free liquid that can run out if the cell is inverted. They contain electrodes of carbon and zinc, the space between which is filled with a paste that acts as a depolarizer. Many different compositions have been recommended for the paste, among them the following, which is said to give excellent results: Charcoal, 3 parts; graphite, 1 part; peroxide of manganese, 3 parts; slaked lime, 1 part; "white arsenic" (arsenic trioxide), 1 part, a mixture of glucose and starch, 1 part; all by weight. These are to be intimately mixed while dry, and then worked into a smooth paste with equal parts of a saturated solution of sal ammoniac and a similar solution of common salt, to which one tenth (by volume) of a saturated solution of corrosive sublimate and one tenth (also by volume) of hydrochloric acid have been added. Dry batteries are not intended for continuous service, but (like the Leclanché element, to which they are closely related) for the production of transient currents, at considerable intervals.

A form of battery, devised by Mr. Latimer Clark for use in laboratories as a standard of electromotive force, is now commonly employed for this purpose in all exact electrical researches, where the precise determination of an electromotive force is important. As described in his original paper ('Philosophical Transactions' 1875), the cell contains zinc, sulphate of zinc, sulphate of mercury, and mercury; the zinc and mercury forming the respective electrodes. All the materials used must be chemically pure, both the mercury and the zinc being distilled. The sulphate of mercury used in the cell is the *mercurous* salt, Hg_2SO_4 , which is prepared by treating pure mercury with an equal weight of pure concentrated sulphuric acid, the mixture being warmed, but kept well below the boiling point (212°F). The white solid that is produced should be removed before all of the mercury disappears, in order to avoid the formation of the *mercuric* sulphate (HgSO_4), which is detrimental to the battery, and which may be recognized, when present in any considerable quantity, by its transformation, upon addition of water, into a yellow basic salt (perhaps $\text{HgSO}_4 \cdot 2\text{HgO}$), and free sulphuric acid. The mercury sulphate should be thoroughly washed, before use,

BATTEUX

to remove the last trace of free acid. The zinc sulphate is used in the form of a saturated solution, prepared by dissolving the compound in boiling water, and then allowing it to cool. The sulphate of mercury is made into a thick paste with the zinc sulphate solution, and the whole is then heated to 212° F., to expel any air that may be present. The bottom of the cell that is to be used is then well covered with mercury (which is to serve as the positive electrode), after which the paste is poured in. The zinc is suspended in the paste, and the vessel is finally sealed with melted paraffin. The positive connection is made by sealing a platinum wire into the bottom of the cell, or by running the wire down through the paste to the mercury, protecting it by a glass tube. When great accuracy is desired, numerous minute precautions must be observed in the manufacture of these cells, and also in their subsequent use. Such details are to be found chiefly in papers that have appeared in the various scientific journals. (See, for example, Glazebrook and Skinner, 'Philosophical Transactions, A,' 1892.) There is still some small difference of opinion among the various authorities as to the exact electromotive force of the Clark cell, but it is certainly very close to 1.433 volts at 60° F., and it varies about 0.00061 volt per Fahrenheit degree, being lower at higher temperatures, and *vice versa*. Various attempts have been made to devise an electric battery in which some substance other than zinc shall be consumed, to furnish the electrical energy. Iron has been used with some degree of success, but, for one reason or another, iron-consuming batteries have never come into general favor. Magnesium batteries have also been used to a limited extent; a magnesium-carbon element, with a bichromate of potassium depolarizing solution, giving an electromotive force as high as 2.95 volts. The expense of batteries consuming magnesium is too great, however, to permit them to be used for any but experimental purposes.

The ideal electric battery would be one in which carbon is the substance consumed, and inventors have turned their attention to this particular problem with great energy, but with no very considerable measure of success, although there does not appear to be any theoretical reason why a practical and serviceable battery of this sort may not be ultimately discovered. A quarter of a century ago, M. Jablochkoff constructed a cell in which the liquid was melted nitrate of soda or nitrate of potash, the negative electrode (or electrode to be consumed) being of coke, while the positive one was of platinum or cast iron. The coke electrode is brought to incandescence over a part of its surface, before being immersed in the liquid. Upon immersion the coke then burns fiercely, obtaining its oxygen from the melted nitrate, and sending forth large volumes of carbon dioxide gas. While the combustion continues, the cell is capable of generating quite a sensible electric current; but it does not appear that its electromotive force has been determined with any great precision. M. Jablochkoff's carbon-consuming battery cannot be regarded as more than a scientific curiosity, but it is nevertheless interesting, because it demonstrates the possibility of a carbon-consuming battery. About 1895 Dr.

William W. Jacques devised a form of electric battery which was thought, for a time, to obtain its energy from the oxidation of carbon. Each cell consisted of a cast-iron pot, which served as a containing vessel, and at the same time as the positive electrode. The negative electrode was a stick of carbon, suspended centrally in the cell. The liquid was caustic soda or caustic potash, which was kept in a state of fusion by means of a furnace, and through which a stream of air was blown, by means of a kind of rose nozzle entering at the bottom of the pot. The electromotive force of a single cell of this battery is about 0.9 volt. Dr. Jacques' theory of the cell was that the furnace merely served to keep the caustic melted, while the electric energy furnished by the battery had its origin in the oxidation of the carbon rods in the cells, the oxygen needed for this oxidation being furnished by the blast of air. In the course of some tests carried out by Dr. Jacques and others with this idea in mind, the loss in weight of the carbon rods was compared with the output of electrical energy yielded by the battery, the result being that the apparatus showed an efficiency, in one case, of no less than 87 per cent. Unfortunately, investigations made by others do not justify Dr. Jacques' hypothesis as to the origin of the electrical energy in his battery. Thus Mr. C. J. Reed showed that the disintegration of the carbon is merely incidental, and that the carbon can be replaced by iron, brass, copper, german silver, or other metallic bodies, without detriment to the battery. He also found that the cell works much better and lasts much longer, if the caustic potash is replaced by nitrate of potash; and, finally, he proved that a blast of common illuminating gas may be substituted for the air, without lessening the electrical yield of the apparatus. These results established the fact, beyond doubt, that the Jacques battery is not a galvanic battery at all, but a form of the thermo-electric apparatus, drawing its energy from the fuel that is consumed in the furnace below the pots. The chemical energy of the coal in the furnace is first transformed into heat, and only later into electrical energy. The battery is therefore amenable to the second law of thermodynamics (q.v.), which is the great obstacle that the successful carbon-consuming battery must avoid. See ELECTRICITY; STORAGE BATTERY.

In law, the unlawful beating of another, or even the touching him with hostile intent. It is legitimate for a parent or a master to give moderate correction to his child, his scholar, or his apprentice. A person who is violently assailed by another may strike back in self-defense. He may do so also in defense of his property. But to strike anyone in anger, however gently, without these justifications, exposes one to the liability to be prosecuted for assault and battery, the assault being the menacing gesture and the battery the actual blow. Wounding and mayhem are a more aggravated kind of battery.

In military art, any work in which one or more cannon are planted, and which may be permanent or temporary. See FORTIFICATION.

Batteux, ba-tè, Charles, French scholar, honorary canon of Rheims: b. Alland'huy, 1713; d. 14 July 1780. He displayed his gratitude to this city, in which he received his education,

BATTHYANYI — BATTLE

by the ode 'In Civitatem Remensem' (1739), which was much admired. In 1750 he was invited to Paris, where he taught rhetoric in the colleges of Lisieux and Navarre. He was afterward appointed professor of Latin and Greek philosophy at the Royal College. In 1754 he became a member of the Academy of Inscriptions, and in 1761 of the French Academy. Batteux left a large number of valuable works. He did much service to literature and the fine arts, by introducing unity and system into the numerous canons of taste, which had gained a standing among the French by the example of many eminent men, particularly in regard to poetry, and must be regarded as a valuable writer on æsthetics, notwithstanding the higher point of view from which this science is now considered. Some of his most valuable works are: 'Les Beaux-Arts réduits à un même Principe,' (1747); and 'Cours de Belles-Lettres ou Principes de la Littérature' (1774). These works were translated into several other languages.

Batthyanyi, böt'yá-nye, Count Kasimir, Hungarian statesman, minister of foreign affairs during the Hungarian revolution: b. 4 June 1807; d. Paris, 13 July 1854. From his earliest childhood he took a lively interest in public affairs, and after having, as member of the Hungarian diet, opposed the Austrian government, he became, at the outbreak of the revolution, one of the prominent champions of Hungarian independence, devoting his wealth and influence to the promotion of this cause, and at the same time distinguishing himself on various occasions by his courage and skill on the battlefield. After having officiated as governor of various provinces, he became minister of foreign affairs, under the administration of Kossuth, and subsequently he shared his exile in Turkey until 1851, when he repaired to Paris, where he died. Although sympathizing with Kossuth in some respects, he differed from him in others, and addressed, in 1851, a series of letters to the London *Times*, in which he reflected rather severely upon Kossuth's character as statesman and patriot.

Batthyanyi, Count Louis, Hungarian patriot: b. Pressburg, 1809; d. 6 Oct. 1849. He entered the army as a cadet at the age of 16, and on coming into possession of a large fortune, abandoned a military for a diplomatic career, and in process of time attained the rank of leader of the opposition in the Hungarian diet. Upon the breaking out of the commotions of 1848, Batthyanyi took an active part in promoting the national cause, and with a company of armed vassals came forward to assist it in the field. On the entry of Windischgrätz into Budapest in January 1849, he was arrested in the house of his sister-in-law, the Countess Karolyi. After being conveyed to various places he was finally brought back to Budapest, tried by court-martial, and condemned to be hanged. The execution of this sentence he prevented by inflicting several wounds with a poinard on his neck, and he was accordingly shot.

Batti'adae, a dynasty of Cyrene which reigned from the 7th to the 5th century B.C. The kings of this dynasty were: Battus I., the founder of Cyrene; Arcesilaus I., his son; Battus II., son of Arcesilaus, who greatly increased the power of Cyrene; Arcesilaus II., son of

Battus II.; Battus III., son of Arcesilaus II.; Arcesilaus III., son of Battus III., who submitted to the Persian king; Battus IV., son of Arcesilaus III.; Arcesilaus IV., son of Battus IV., the last king of Cyrene, killed in a revolution. He is celebrated in fourth and fifth Pindaric odes.

Battik, an oriental production of the natives of the Dutch East Indies, who decorate their clothing with it; also made in The Hague for local use and export. Upon a piece of linen various designs are outlined with a pencil. When the design is completed, the ornamented parts of the fabric are covered with a liquid which possesses the quality of stiffening after being applied. The parts not ornamented are dyed the desired color. After the entire fabric has been ornamented in this manner, it is boiled in hot water so as to take the hard stuff out of the battik. The dyed parts will then hold the dye and the battik is ready. The Hague people were the first to introduce battik into Europe. It is made on linen, silk, velvet, and leather, and is exported to all the principal cities of Europe.

Battle, Cullen Andrews, American military officer: b. Powelton, Ga., 1 June 1829. He was graduated from the University of Alabama; admitted to the bar in 1852 and practised till 1860; was a Breckenridge and Lane Presidential elector, and accompanied William L. Yancy in his canvass of Alabama. At the outbreak of the Civil War he entered the Confederate army, and during the war was wounded seven times, promoted brigadier-general on the field of Gettysburg, and major-general in October 1864. After the war he engaged in journalism in Newbern, N. C.

Battle, Kemp Plummer, American educator: b. Franklin County, N. C., 19 Dec. 1831. He graduated at the University of North Carolina in 1849; was a member of the State convention of North Carolina in 1861 that passed the ordinance of secession; State treasurer, 1866-8; president of the University of North Carolina 1876-91; and afterward professor of history there. His works include: 'History of the Supreme Court of North Carolina'; 'History of Raleigh, North Carolina'; 'Trials and Judicial Proceedings of the New Testament'; 'Life of General Jethro Sumner,' as well as numerous writings relating to the history of North Carolina.

Battle, England, a market-town in Sussex. It is situated in a valley nearly encircled by wooded hills, seven miles northwest of Hastings, and consists chiefly of one irregular street, in which there are many old-fashioned buildings; it is well supplied with water, and lighted with gas. The church is ancient, and contains some fine specimens of painted glass and numerous antique monuments. There are places of worship also for Wesleyans, Baptists, Roman Catholics, and Congregationalists, and endowed schools. Battle was long celebrated for the manufacture of gunpowder. The original name of this place was Senlac, and it received its present name from the battle of Hastings which was fought here. In memory of the battle William the Conqueror erected a great abbey, the ruins of which have a circumference of about a mile. This building has almost entirely disappeared, but interesting re-

BATTLE

mains of a subsequent building exist, including the gateway, a beautiful specimen of the decorated English style. One portion of this building now forms a mansion, which until very lately was the residence of Lord Rosebery's mother, the Duchess of Cleveland. See Walcott, 'History of Battle Abbey' (1867); Duchess of Cleveland, 'The Roll of Battle Abbey' (1889). Pop. (1901) 2,996.

Battle. The object of a war may be obtained in two different ways: one party either forces the enemy, by skilful manœuvres, marches, demonstrations, the occupation of advantageous positions, etc., to quit the field (which belongs to the province of strategy); or the hostile masses approach each other, so that a battle becomes necessary to determine which shall keep the field. Troops may either meet by design or by chance. When they meet by chance, and are thus obliged to fight, it is called a *rencontre*. The rules for insuring a successful issue, whether they respect the preparations for the conflict, or the direction of the forces when actually engaged, belong to tactics, in the narrower sense of the word. Strategy also shows the causes which bring armies together, and produce battles without any agreement between the parties. It may be sufficient to say, in general, that armies in their marches (and consequently in their meeting) are chiefly determined by the course of the mountains and rivers of a country. In ancient times and the Middle Ages the battle-ground was often chosen by agreement, and the battle was then a mere trial of strength, a sort of duel; but, in our time, such trifling is done away with. War is now carried on for the real or pretended interest of a nation, or of a ruler who thinks or pretends that his interest is that of the nation. Wars are now undertaken for the purpose of fighting, and battles are merely the consequence of pursuing the purpose of the war. They arise from one party's striving to prevent the other from gaining his object. Every means, therefore, of winning the battle is resorted to, and an agreement can hardly be thought of. In this respect a land battle is entirely different from a naval one. The former is intended merely to remove an obstacle in the way of gaining the object of the war; the destruction of the enemy, therefore, is not the first thing sought for. But the object of a naval engagement is, almost always, the destruction of the enemy; those cases only excepted in which a fleet intends to bring supplies or reinforcements to a blockaded port, and is obliged to fight to accomplish its purpose.

As the armies of the ancients were not so well organized as those of the moderns, and the combatants fought very little at a distance, after the battle had begun manœuvres were much more difficult, and troops, when actually engaged, were almost entirely beyond the control of the general. With them, therefore, the battle depended almost wholly upon the previous arrangements, and the valor of the troops. Not so in modern times. The finest combinations, the most ingenious manœuvres, are rendered possible by the better organization of the armies, which, thus, generally at least, remain under the control of the general. The battle of the ancients was the rude beginning of an art now much developed. It is the skill of the

general, rather than the courage of the soldier, that now determines the event of a battle.

Battles are distinguished into offensive and defensive. Of course, a battle which is offensive for one side is defensive for the other. Tacticians divide a battle into three periods—that of the disposition, that of the combat, and the decisive moment. The general examines the strength, reconnoitres the position, and endeavors to learn the intention of the enemy. If the enemy conceals his plan and position, skirmishes and partial assaults are often advisable, in order to disturb him, to obtain a view of his movements, to induce him to advance, or with the view of making prisoners, who may be questioned, etc. Since the general cannot direct all these operations in person, officers of the staff assist him; single scouts or small bodies are sent out, and spies are employed. Every means is made use of for obtaining information regarding the enemy, or the ground on which the battle is likely to take place. According to the knowledge thus acquired, and the state of the troops, the plan of battle, or the disposition, is made; and here military genius has an opportunity to display itself. To the disposition also belongs the detaching of large bodies which are to co-operate in the battle, but not under the immediate command of the chief. The plan of the battle itself, the position of the troops, etc., is called the order of battle (*ordre de bataille*). This is either the parallel, or the inclosing (if the enemy cannot develop his forces, or you are strong enough to outflank him), or the oblique. When each division of troops has taken its position, and received its orders, and the weaker points have been fortified (if time allows it), the artillery placed on the most favorable points, all chasms connected by bridges, villages, woods, etc., taken possession of, and all impediments removed as far as possible (which very often cannot be done, except by fighting), then comes the second period—that of the engagement. The combat begins, either on several points at a given signal, as is the case when the armies are very large, and a general attack is intended, as, for instance, at Leipsic, where three fire-balls gave the signal for battle on the side of the allies; or by skirmishes of the light troops, which is the most common case. The artillery endeavors to dismount the batteries of the enemy, to destroy his columns, and, in general, to break a passage, if possible, for the other troops. The forces, at the present day, are brought into action mostly in open order, and not, as formerly, in long but weak lines. Here the skill of the commanders of battalions is exerted. Upon them rests the principal execution of the actual combat. The plans and orders of a general reach only to a certain point; the chiefs of battalions must do the great work of the battle. Before the battle, the general places himself upon a point from which he can see the conflict, and where he can easily receive reports. A few men are near him as his body-guard; others take charge of the plans and maps; telescopes are indispensable. He often sends one of his aides to take command of the nearest body of cavalry, in order to execute a new movement quickly. He receives the reports of the generals under him; disposes of the troops not yet in action; strengthens weak points; throws his force on the enemy where he sees

BATTLE ABOVE THE CLOUDS—BATTLE CREEK

them waver; or changes, if necessary, with a bold and ingenious thought, the whole order of battle. The general now uses every means to bring on the third period of the battle—the decisive moment.

In the Austro-German campaign of 1866, and the still more important Franco-German campaign of 1870, great changes were developed both in strategy and tactics. The changes in strategy were due chiefly to the ease with which the general could direct detached bodies of troops over a wide area by means of the telegraph, and the facility with which troops, provisions, and ammunition could be moved from point to point by railway. The changes in tactics, again, arose chiefly from the longer range and quicker firing capacity of modern rifles, and the greater importance attached to the massed firing of long-range breech-loading artillery. Still greater changes in tactics and strategy have been brought about by such recent inventions as those of smokeless powder and lyddite shells, and in the Spanish-American and Anglo-Boer wars these changes were made very manifest. See also STRATEGY, TACTICS

Battle Above the Clouds, The, the name given to that portion of the battle of Chattanooga fought on Lookout Mountain, Tenn., 24 Nov. 1863. See CHATTANOOGA, BATTLE OF

Battle Axe, a military weapon much used in the early part of the Middle Ages, particularly by those who fought on foot. It was not uncommon, however, among the knights, who used also the mace, a species of iron club or hammer. Both are to be seen in the different collections of old arms in Europe. The Greeks and Romans did not employ the battle axe, though it was found among contemporary nations. In fact, the axe is one of the earliest weapons, its use as an instrument of domestic industry naturally suggesting its application for purposes of offense, but, at the same time, it has always been abandoned as soon as the art of fencing, attacking, and guarding was cultivated, because the heavier the blow given with this instrument, the more will it expose the fighter. It never would have remained so long in use in the Middle Ages had it not been for the iron armor, which protected the body from every thing but heavy blows. In England, Ireland, and Scotland, the battle axe was much employed. At the battle of Bannockburn, King Robert Bruce clave an English champion down to the chin with one blow of his axe. The Lochaber-axe remained a formidable weapon in the hands of the Highlanders to a recent period, and was used by the old city guard of Edinburgh. A pole axe is a long-handled battle axe.

Battle of the Books, The, a famous work by Jonathan Swift, written in 1697, but remaining in manuscript until 1704. It was a travesty on the endless controversy over the relative merits of the ancients and moderns, first raised in France by Perrault. Its immediate cause, however, was the position of Swift's patron, Sir William Temple, as to the genuineness of the 'Letters of Phalaris.' The work, despite its vast cleverness, was not taken with entire seriousness by Swift's contemporaries. It remains, however, a brilliant monument to his satirical powers.

Battle Creek, Mich., a city of Calhoun County, situated on the Kalamazoo River at

its junction with the Battle Creek, and on the Grand Trunk Western, Michigan Central, and Detroit, Toledo & Milwaukee Railroads, 121 miles west of Detroit and 163 miles east of Chicago.

Industries, Banks, Etc.—Battle Creek is located in the midst of the best farming section of the State and agriculture and fruit-growing are carried on extensively. It is as a manufacturing city, however, that Battle Creek is best known, having more than 70 factories in active operation employing about 5,000 people. The weekly pay-roll of factories alone is over \$100,000. There are large plants which make more threshing machines, traction engines and steam pumps than are made in any other city in the world. There are also planing mills, boiler works, brick yards, flouring mills, foundries, cigar factories, bottling works, ice plants, ironworks, candy factories, a brewery, pipe-organ factory, etc. The city is also noted for the manufacture of cereal foods. The Grand Trunk Western shops are located here, this being the only division between Port Huron and Chicago. There are two national, two State and one private banks, with a combined capital of \$450,000, surplus \$226,000, and deposits \$4,216,000.

Societies, Buildings, Education, Etc.—Battle Creek has over 50 secret and fraternal societies, a Nature Club, a Musical Union, a Woman's Club, a Woman's League which owns a business block and has a noon-day rest and free dispensary, a Y W C A and Y M C A, a company of State militia and the Athelstan Club, a social organization, composed of business and professional men. The Young Men's Christian Association building is the gift of the late Charles Willard and cost \$40,000. The new public library costing \$70,000 is also the gift of Mr. Willard. A fine hospital costing \$35,000 was presented to the city by the late John Nichols. Other interesting buildings are the Post Theatre (costing \$60,000), Post Tavern, the Phelps Sanitarium, and Battle Creek Sanitarium (qv). The city has over 20 churches and is known as one of the largest centres of the Seventh Day Adventists (see ADVENTISTS). There are 10 public schools, 100 teachers and over 4,000 children of school age, a Catholic parish school, and three business colleges. Over \$90,000 was spent for school maintenance in 1903. There are daily and weekly papers and a number of monthly publications, some of them published in foreign languages.

History, Government, Etc.—Battle Creek was first settled in 1832 by families from New York and New England and has always been noted as a distinctively American city, the percentage of foreign born citizens being relatively small. It was incorporated as a city in 1850 and its government is under a general charter and a council of 10 members, five of whom are elected each year for a term of two years. The city owns its own water system with a capacity of over 1,500,000 gallons of water per day; has paid fire and police departments, electric light and gas plants, and two telephone systems. The city owns a splendid park at Lake Goguac, and is an attractive summer resort on account of the numerous lakes in the vicinity. Battle Creek stands third among the cities of the State in the amount

BATTLE CREEK 'SANITARIUM — BATTLE-SHIP

of post-office business, exceeded only by Detroit and Grand Rapids. Pop. (1904 census), 22,213

CHAS. E. BARNES,
City Editor Journal.

Battle Creek Sanitarium, The, is a philanthropic and humanitarian institution operating under a perpetual charter which compels the use of all the profits gained to foster the spread of humanitarian work. More than 60 branches of the parent institution have been established in or near large cities in different parts of the world, under the title of The American Medical Missionary Association, and each of these branches conducts a life-saving business on Good Samaritan principles. The organization began its work in the year 1866, with almost no capital and only one patient, in a small two-story frame house, in the then small village of Battle Creek, Mich. The incorporators believed that Christianity should be expressed in works as much as in faith, in curing the sick and healing the wounded, and thus preparing the unfortunate for the reception of moral and spiritual inspiration.

The Golden Rule is the foundation principle of the institution. It has grown from a small beginning to the immense proportions of the present time, with one of its buildings nearly a thousand feet in length and six stories in height and numerous other buildings radiating from the main one and scattered about it in a finely wooded park. Fire destroyed the old building and all its contents, but it was soon rebuilt larger and better than before.

Battle Cry of Freedom, The, a patriotic song of the American Civil War by the well-known composer, George Frederick Root (1861).

Battle of Dorking, The, a realistic, matter-of-fact description of an imaginary invasion of England by a foreign power, by Charles Cornwallis Chesney. It appeared first in 'Blackwood's Magazine' in 1871, and has since been reprinted under the title 'The Fall of England'. After the ignominious defeat of the French at Sedan, Col Chesney, professor of military history at Sandhurst, foresaw a similar fate for his own country unless it should reorganize its army. He urged vigorous measures of reform; and as the necessity for these was not perceived by the country at large, he contributed to the press various articles, both technical and popular, among them 'The Battle of Dorking.' The fleet and army are scattered when war is declared, but the government has a sublime confidence that British luck and pluck will save the country now as hitherto. To universal surprise and consternation, the hostile fleet annihilates the available British squadron, and the enemy lands on the south coast. Volunteers are called out, and respond readily; but ammunition is lacking, the commissariat is unorganized, and the men, though brave, have neither discipline nor endurance. The decisive battle is fought at Dorking, and the British are routed in confusion. Woolwich and London are in the hands of the enemy, and England is compelled to submit to the humiliating terms of the conqueror. She is stripped of her colonies, and pays a heavy war indemnity, all because power has come into the hands of the rabble, who have neither foresight nor patriotism to preserve the liberties of their country.

Battle of the Frogs and Mice, The. See BATRACHOMYOMACHIA.

Battle-Ground, Ind., a town in Tippecanoe County, where the famous battle of Tippecanoe was fought between the United States troops under Gen. Harrison and the Indians under Tecumseh and his brother, "The Prophet," 7 Nov. 1811.

Battle Hymn of the Republic, The, a celebrated poem by Mrs. Julia Ward Howe, published in the 'Atlantic Monthly' in 1862, and sung to the air, "John Brown's Body."

Battle of the Kegs, The. See HOPKINSON, FRANCIS.

Battle, Law of, the contest between male animals for possession of the females, among barbarous nations. Among certain tribes of the North American Indians the men wrestled for any women to whom they were attached. With the Australians the women were the constant cause of war, both between the individuals of the same tribe and between distinct tribes. In mammals the male, says Darwin, appears to win the female much more through the law of battle than through the display of his charms. The most timid animals, even the hare, will fight desperately, the duel only ending by the death of one of the parties. Male moles, squirrels, and beavers have been seen fighting for their mate. In connection with this subject Darwin's 'Descent of Man' and similar works should be consulted.

Battle Monument, a monument in Baltimore, Md., erected in memory of those who fell in defense of the city when it was attacked by the English forces in September 1814.

Battle of the Spurs, a battle of Guinegate, 16 Aug 1513, in which the French cavalry were defeated by the forces of Henry VIII of England and the emperor Maximilian. It was thus named on account of the numberless gilt spurs gathered by the victors.

Battle, Trial by, or Wager of, an obsolete method of deciding cases, whether civil or criminal, by personal combat between the parties or their champions in presence of the court. A woman, a priest, a peer, or a person physically incapable of fighting could refuse such a trial. This mode of trial ended in Scotland with the close of the 16th century. See Stephen, 'History of the Criminal Law of England' (1883); Neilson, 'Trial by Combat' (1890).

Battledore and Shuttlecock, a popular game invented in the 14th century. The implements are a bat shaped like a tennis racket and strung with gut or covered with parchment, and a shuttlecock consisting of a cork stuck with feathers, which is batted to and fro between the players.

Battleford, the chief town of the Saskatchewan district of the Northwest Territories of Canada, on the river Battle near its junction with the North Saskatchewan, about 100 miles west-by-south of Prince Albert. The Riel insurrection began near Battleford. It was the capital of the Northwest Territory, 1876-83. Pop. (1901) 797.

Battle-ship. See NAVAL ARCHITECTURE; WARSHIPS, MODERN.

Batwa, bāt'wā, a tribe of pygmies living in the Wissmann Falls district of southern-central Africa. They are sometimes less than four feet high, but well shaped and well developed. They live in villages and are under the protection of the Bakuba. Their food consists of meat, wild roots, and a few vegetables which they cultivate. Their weapons are knives, bows and arrows, poisoned with the juice of the root of a species of Euphorbia. Their household furniture is very simple, and they do not make pottery, weave, or work in metals.

Bauan, bow'an, or **Bauang**, Philippines, a town of Luzon in the province of Babangas, 4 miles northeast of the town of Babangas, Pop. 39,659.

Baucher, bō-shā, François, French hippologist: b. Versailles, 1796; d. Paris, 14 March 1873. He is remembered because of his method of training saddle horses and his book 'Méthode d'Equitation basée sur des nouveaux principes' (1842).

Baucis, in mythology, a Phrygian woman, the wife of Philemon. They received Jupiter and Mercury hospitably, after these gods had been denied hospitality in the whole country while traveling in disguise. A deluge destroyed the remainder of the people, but Philemon and Baucis, with their cottage, were saved. They begged the gods to make their cottage a temple, in which they could officiate as priest and priestess, and that they might die together; which was granted. Philemon and Baucis are, therefore, names often used to indicate faithful and attached married people.

Baudelaire, bōd-lār, Charles Pierre, French poet. b. Paris, 9 April 1821; d. 30 Aug 1867. In early life he resided for some time in the East Indies, and on his return devoted himself to literature. He first gained some reputation by translations from the works of Edgar Allan Poe, four volumes of which appeared in 1856-65, regarded as masterpieces in their way. A production, however, that caused greater sensation was a collection of poems designated 'Les Fleurs du Mal' (1857), which had to be expurgated as the result of proceedings on the part of the police authorities. This work gave Baudelaire a high position as a writer of the romantic school, and evidenced at the same time his curious inclination for repulsive subjects. A work of higher tone was his 'Petits Poèmes en Prose'; others being 'Les Paradis Artificiels'; 'Opium et Haschich'; a monograph on Théophile Gautier; and 'R. Wagner et Tannhäuser à Paris.' Apart from his verse, however, Baudelaire's finest work is contained in his 'Little Poems in Prose.' All of these are exquisitely written, and in many of them the beauty of the thought is equal to the beauty of the language. He united a remarkably keen analytic faculty with a powerful, sombre imagination. Brooding melancholy, curiously tinged with irony, inspires the solemn music and dream-like imagery of his best verses. The writer whom, in many respects he resembles most strongly is Edgar Allan Poe. See James, 'French Poets and Novelists' (1884); Asselineau, 'Charles Baudelaire et vie et son oeuvre' (1889).

Baudens, bō-dān, Jean Baptiste Lucien, French surgeon: b. Aire, 3 April 1804; d. 3 Dec. 1857. He was a surgeon in the French army in Algeria 1830-41 and founded a hospital there in which he taught surgery for nine years. He published 'Nouvelle Méthode des Amputations' (1842); 'La Guerre du Crimée'; 'Clinique des Plaies d'Armes à Feu.'

Baudin, bō-dān, Nicolas, French sea-captain and botanist: b. on the island of Ré, 1750; d. 16 Sept. 1803. He entered the merchant navy at an early age, and in 1786, went on a botanical expedition to the Indies, sailing from Leghorn under the Austrian flag, with a vessel under his own command. His collections in this expedition, and in a second which he made to the West Indies, were presented by him, on his return to France, to the government, which promoted him to the rank of captain, and sent him, in 1800, on a scientific mission to Australia. He failed to penetrate the interior of that country, but made many interesting observations on the coast. Half of his men died of fatigue and exposure, and he himself soon breathed his last at the Isle of France, on his return. Péron accompanied him and wrote an account of the voyage.

Baudin des Ardennes, bō-dān-dāz-ār-dēn, Charles, French vice-admiral: b. Sedan, 21 July 1784; d. Paris, 7 June 1854. In 1812 he conducted a small fleet safely into the harbor of St. Tropez, though continually pursued by English cruisers. In 1816, he resigned, and entered the merchant service, but after the July revolution re-entered the navy. In 1838, he was promoted to the rank of rear-admiral, and received the command of the expedition against Mexico. His efforts to effect an amicable settlement with the Mexican government proving fruitless, he bombarded, 27 Nov. 1838, the fortress of San Juan de Ulloa, which surrendered on the following day. Baudin treated the inhabitants with great consideration, and permitted 1,000 Mexican soldiers to remain in the city to maintain order, but on the Mexican government sending re-enforcements, he was compelled to resort again to hostilities, which, on 5 December of the same year, resulted in the disarming of Vera Cruz, in the complete defeat of the Mexican army, and in the restoration of peace between the two countries. On his return to France, he was for a short time minister of marine under Louis Philippe. In March 1848 he was appointed commander of the French fleet in the Mediterranean, and remained stationed for some time during the Italian outbreak off the Neapolitan and Sicilian coast. In the following year he retired from active service.

Baudissin, bow'dis-sin, Wolf Friedrich Karl, Count von, German littérateur: b. Rantzau, 30 Jan. 1789; d. Dresden, 4 April 1878. After 1827 he resided at Dresden, where he collaborated with Tieck and Schlegel in a noted translation of Shakespeare. The translations contributed by Baudissin are those of 'Henry VIII.'; 'Much Ado About Nothing'; 'Taming of the Shrew'; 'Comedy of Errors'; 'Measure for Measure'; 'All's Well that Ends Well'; 'Antony and Cleopatra'; 'Troilus and Cressida'; 'Merry Wives of Windsor'; 'Love's Labor's Lost'; 'Titus Andronicus'; 'Othello'; 'King Lear.' He published 'Ben

Jonson und Seine Schule' (1836); and translations from Molière (1865-7).

Baudissin, Wolf Wilhelm, German theologian: b. Sophienhof, Holstein, 26 Sept. 1847. He was professor at Strassburg, 1876-81, at Marburg, 1881-1900, and at Berlin from 1900. His publications comprise 'Translations Antiquæ Arabicæ Libri Jobiquæ Supersunt' (1870); 'Studien Zur Semitischen Religionsgeschichte' (1870-8); 'Die Geschichte des Alttestamentlichen Priesterthums untersucht' (1889); 'August Dillmann' (1895).

Baudrillart, bō-dre-yār, Henri Joseph Léon, French political economist. b. Paris, 28 Nov. 1821; d. there, 24 Jan. 1892. He edited the *Constitutionnel* and subsequently the *Journal des Economistes*, and in 1881 was professor in the Ecole des Ponts et Chaussées. He published 'Des rapports de la Morale et de l'Economie Politique' (1860); 'Manuel d'Economie Politique' (1857); 'Publicistes Modernes' (1862); 'Histoire du Luxe' (1878-80); 'Les Populations Agricoles de la France' (1880-8).

Baudry, bō-dre, Paul, French painter. b. La Roche-sur-Yon, 7 Nov. 1828; d. 17 Jan. 1886. He studied in Paris and Rome. Among his best known works are 'Punishment of a Vestal Virgin' (1857), and the 'Assassination of Marat' (1867). He was for 10 years employed in decorating the foyer of the Grand Opéra in Paris. His famous 'Glorification of the Law' on the ceiling of the Palace of Justice gained him the medal of honor in 1881 and is generally ranked as his masterpiece. He was elected a member of the Académie des Beaux-Arts in 1870.

Bauer, bow'er, Bruno, German philosopher, historian, and Biblical critic of the rational school. b. Eisenberg, 6 Sept. 1809; d. Berlin, 15 April, 1882. Among his works are: 'Critique of the Gospel of John' (1840); 'Critique of the Synoptic Gospels' (1840); 'History of the French Revolution to the Founding of the Republic' (1847); 'History of Germany during the French Revolution and the Rule of Napoleon' (1846); 'Critique of the Gospels' (1850-1); 'Critique of the Pauline Epistles' (1850); 'Philo, Strauss, Renan, and Primitive Christianity' (1874); 'Christus und die Casaren' (1877). His work displays equal learning and industry but his conclusions are far from harmonizing with evangelical thought.

Bauer, Caroline, German actress. b. Heidelberg, 29 March 1807; d. Zurich, 18 Oct. 1878. She made her debut in 1822, and had achieved a brilliant success, in comedy and tragedy alike, when in 1829 she married Prince Leopold, afterward king of the Belgians. Their morganatic union was as brief as it was unhappy; in 1831 she returned to the stage, which she quitted only in 1844, on her marriage to a Polish count. An English translation of her 'Posthumous Memoirs' appeared in 1884.

Bauer, Edgar, German publicist, brother of Bruno Bauer: b. Charlottenburg, 7 Oct. 1820; d. Hanover, 18 Aug. 1886. He published various works of an historical and polemical nature strongly tinged with radicalism, and spent five years in prison on account of his 'Streit der Kritik mit Kirche und Staat.' Other books by

him are 'Die Rechte des Herzogtums Holstein' (1863); 'Die Deutschen und ihre Nachbarn' (1870).

Bauer, Louis A., American mathematician: b. Cincinnati, O., 28 Jan. 1865. He was astronomical and magnetic computer for the United States Coast and Geodetic Survey, 1887-92; docent in mathematical physics in the University of Chicago, 1895-6; chief of division of terrestrial magnetism of Maryland Geological Survey since 1896. He became assistant professor of Mathematics in the University of Cincinnati in 1897. He is an honorary member of the Sociedad Científica Antonio Alzate de Mexico, and a member of the Permanent Committee on Terrestrial Magnetism and Atmospheric Electricity of the International Meteorological Conference. He edits and publishes the 'Terrestrial Magnetism.'

Bauer, Wilhelm, German inventor: b. Dillingen, 1822, d. Munich, 18 June 1875. He served as an artilleryman during the Schleswig-Holstein war (1848), and, meanwhile, conceived the plan of a submarine vessel for coast defense. From 1851 to 1855 he vainly sought means from Austria, France, and England to complete his experiment, but Russia finally adopted his scheme. He afterward made improvements in torpedoes and in submarine guns.

Bauerle, boi'ër-lë, Adolf, Austrian dramatist and novelist. b. Vienna, 9 April 1786; d. Basel, 20 Sept. 1859. He cultivated with much success the field of popular comedy and local farce in Vienna, where, in 1804, he founded the *Vienna Theatre-Gazette*, until 1847 the most widely read paper in the Austrian monarchy, and now a valuable source for the history of the stage in Vienna. Of his numerous plays the following became known also outside of Austria: 'Leopold's Day' (1814); 'The Enchanted Prince' (1818); 'The Counterfeit Prima Donna' (1818); 'A Deuce of a Fellow' (1820); 'The Friend in Need'. Under the pseudonym OTTO HORN he wrote the novels 'Therese Krones' (1855) and 'Ferdinand Raimund' (1855), full of the personal element and local anecdote.

Bauernfeind, bow'ërn-fint, Karl Maximilian von, German engineer and geodesist. b. Arzberg, 18 Nov. 1818; d. 1894. He was professor of geodesy and engineering in the engineering school at Munich, and long a director of the Technical School there organized according to his plans. He invented the prismatic cross employed in surveying, and named for him, and wrote 'Elemente der Vermessungskunde' (1856-8); 'Zur Brückenbaukunde' (1854); 'Zur Wasserbaukunde' (1866).

Bauernfeld, bow'ërn-fëlt, Eduard von, Austrian dramatist: b. Vienna, 13 Jan. 1802; d. Vienna, 9 Aug. 1890. He studied law and entered the government service in 1826, but resigned, after the revolutionary events of 1848, to devote himself exclusively to his literary pursuits. A brilliant conversationalist, he soon became a universal favorite in Vienna society. Intimate from childhood with the genial painter, Moritz von Schwind, and the composer, Franz Schubert, he also kept up a lifelong intercourse with Grillparzer. Among his comedies, distinguished for their subtle dialogue and sprightly humor, particularly the descriptions of

BAUHIN — BAUMGARTEN

fashionable society have made his great reputation. The best known and most successful were 'Reckless from Love' (1831); 'Love's Protocol' (1831); 'Confessions' (1834); 'Domestic and Romantic' (1835); 'Of Age' (1846); 'Krisen' (1851); 'Aus der Gesellschaft' (1866). His serious dramas were less popular. His collected works were issued (1871-3).

Bauhin, bō-āñ, Gaspard, Swiss botanist and anatomist: b. Basel, 1560; d. 1624. He was at first intended for the Protestant ministry, but having manifested a decided inclination for medicine and botany, was allowed to follow it, and studied first at Basel and then at Padua. After finishing his studies he traveled over many parts of Europe, and in 1580 returned to Basel, bringing with him a reputation which immediately secured him the chair of Greek, and in 1589 that of anatomy and botany. His fame rests chiefly on his two works, 'Pinax Theatri Botanici' and 'Theatrum Anatomicum, Botanicum.' Gaspard and his brother, Jean Bauhin, have been happily commemorated by Linnæus, who gave the name of *Bauhinia* to a genus of plants.

Bauhin, Jean John, an eminent Swiss botanist. b. Basel, 1541; d. 1613. He was a brother of Gaspard Bauhin, and distinguished himself by his ardor in natural history pursuits, in prosecuting which he traveled over the greater part of the Alps, Italy, and the south of France, preparing materials for a 'Historia Universalis Plantarum Nova et Absolutissima,' which occupied the larger portion of his life, but was not published till 1650, 37 years after his death. This work, in which he describes 5,000 plants, divided into 40 classes or books, is considered the first in which an attempt was made to give a regular form to systematic botany.

Bauhinia, a genus of more than 200 species of tropical trees, shrubs or climbers of the natural order *Leguminosæ* with beautiful, showy, white to purple blossoms, unlike the usual northern type of legume flower named in honor of the brothers John and Gaspar Bauhin (q.v.). *B. porrecta*, a West Indian tree, is called mountain ebony from its dark-colored wood; *B. racemosa*, the maloo climber, and several other East Indian climbing species are used for making ropes; *B. variegata*, a Malabar species is used in tanning, dyeing, and medicine, and its flower buds for pickles. In southern Florida and southern California several species are very popular as ornamental plants, but in greenhouses few succeed because of the difficulty of securing a dry enough atmosphere without injury to the plants. *B. natalensis*, *B. variegata*, and *B. corymbosa*, probably the most satisfactory greenhouse species, may be treated like oleanders during the winter and planted out of doors in spring.

Baum, bowm, Friedrich, German military officer in the British service in the Revolutionary war. He arrived in Canada in 1776, and in Burgoyne's expedition acted as lieutenant-colonel of the Brunswick dragoons. He was sent out with 800 men and two pieces of artillery on a foraging expedition. Near Bennington, Vt., he was attacked by the New Hampshire militia under Stark, and utterly defeated. He himself was killed 16 Aug. 1777.

Baum, L. Frank, American writer of popular juvenile books: b. Chittenango, N. Y., 15 May 1856. Among his publications are 'American Fairy Tales'; 'Father Goose: his Book'; 'Songs of Father Goose'; 'The Wonderful City of Oz'; 'Navy Alphabet'; 'Army Alphabet.'

Baumann's bow'mans, Cavern (German, *Baumanns Hohle*), an interesting natural cavern in the Harz, about five miles from Blankenburg, in a limestone mountain. It consists of six principal apartments, besides many smaller ones, everywhere covered with stalactites. The earthy ingredients of these petrifications are held in solution by the water which penetrates the rock, and deposits a calcareous stone. The name of this cavern is derived from a miner, who entered it in 1672, with the view of finding ore, but lost his way, and wandered about for two days before he could find the entrance.

Baumbach, bowm'ban, Rudolf, German poet: b. Kranichfeld, Saxe-Meiningen, 28 Sept. 1840. After studying natural science in Wurzburg, Leipsic, Freiburg, and Heidelberg, he lived in Austria several years, but at last at Trieste, where he devoted himself afterward exclusively to writing. In 1885 he removed to Meiningen. He has most successfully cultivated the poetical tale, based upon ancient popular legends. His epics include 'Zlatorog,' a Slovenic Alpine legend (1875, 37th ed. 1892); 'Horand and Hilda' (1879); 'Lady Fair' (1881); 'The Godfather of Death' (1884); 'Emperor Max and His Huntsmen' (1888). His lyric collections are 'Songs of a Traveling Journeyman' (1878); 'Minstrel's Songs' (1882); 'From the Highway' (1882); 'Traveling Songs from the Alps' (1883); 'Adventures and Pranks Imitated from Old Masters' (1883); 'Jug and Inkstand' (1887); 'Thuringian Songs' (1891). He has also published some excellent prose: 'False Gold' (1878), a historical romance of the 17th century; 'Summer Legends' (1881), a book of fairy tales; and 'Once upon a Time' (1889).

Baumé, bō-mā', Antoine, distinguished French chemist and pharmacist: b. Senlis, 26 Feb. 1728; d. 15 Oct. 1804. He obtained the professorship of chemistry in the College of Pharmacy at Paris about 1752, was admitted a member of the Academy of Sciences, chiefly in return for some excellent memorials communicated to that body; wrote 'Elements of Theoretical and Practical Pharmacy,' which went through nine editions in France, and was translated into most European languages, and contributed by his discoveries to numerous important improvements in the arts, particularly in the manufactures of sal ammoniac, soap, and porcelain, in gilding, and the bleaching of silk. His name is familiar from the areometer which he invented, and which is still in use.

Baumeister, bow'mis-ter, Johann Wilhelm, German veterinarian: b. Augsburg, 1804; d. 1846. In 1839 he was appointed a professor in the Stuttgart School of Veterinary Medicine. His 'Handbuch der Landwirtschaftlichen Tierkunde und Tierzucht,' condensed as 'Anleitung zur Kenntniss des Aussern des Pferdes,' attained a seventh edition in 1891.

Baumgarten, bowm'gär-tën, Alexander Gottlieb, German philosopher of the school of Wolff: b. Berlin, 1714; d. Frankfort-on-the-Oder, 1762. He studied at Halle, and was for a time professor extraordinary there. In 1740 he

was made professor of philosophy at Frankfort-on-the-Oder. He is the founder of aesthetics as a science, and the inventor of this name. He derived the rules of art from the works of art and their effects. Hereby he distinguished himself advantageously from the theorists of his time. (See *ÆSTHETICS*.) His ideas of this science he first developed in his academical discussion, 'De Nonnullis ad Poema Pertinentibus' (1735). George Fr. Meier's 'Principles of all Liberal Sciences' (1748-50) originated from his suggestions. Eight years later, Baumgarten published his 'Æsthetica' (1750-8), a work which death prevented him from completing. See 'Schmidt, Leibnitz und Baumgarten' (1875).

Baumgarten-Crusius, bowm'gär-tën-kroo'-ze-üs, **Ludwig Friedrich Otto**, German theologian: b. Merseburg, 31 July 1788; d. Jena, 31 May 1843. He studied theology in Leipsic; became the university preacher in 1810; was appointed professor of theology at Jena, in 1817; and became widely known as a foremost champion of religious liberty. He was a learned and original thinker, but his writing is often obscure. His publications include 'Introduction to the Study of Dogmatics' (1820); 'Manual of Christian Ethics' (1827); 'Outlines of Biblical Theology' (1828); 'Outlines of Protestant Dogmatics' (1830); 'Text-book of the History of Doctrines' (1832); 'Schleiermacher, His Method of Thought, and his Value' (1834); 'Considerations on Certain Writings of Lamennais' (1834), etc.

Baumgartner, Alexander, Swiss writer: b. Saint Gall, 1841. He became a member of the Society of Jesus in 1860, and after completing his theological studies in England, made a study of Scandinavian literature in Stockholm and Copenhagen. He has published 'Goethe's Jugend' (1879); 'Longfellow's Dichtungen' (1878) 'Calderon', a festival play (1881); 'Goethe und Schiller' (1886); 'Der Alte von Weimar' (1886); a translation from the old Icelandic of Eystein Asgninsson; and a history in eight volumes of the world's literature (1897).

Baumgartner, bowm'gärt-nër, **Andreas von**, Austrian statesman: b. 23 Nov. 1793, at Friedberg in Bohemia; d. 1865. He was connected for many years with the teaching of mathematics and physics, especially after 1823, at the University of Vienna, until illness forced him to relinquish his academical pursuits. Subsequently he became connected with the direction of the imperial porcelain, tobacco, and other manufactures in 1841, with the establishment of electric telegraphs, and at the end of 1847 with the chief management of the construction of railways. After the revolution of March 1848, he occupied for a third time a seat in the Austrian cabinet as minister of the mining department and of public works. In May 1851, he became minister of finance and commerce, and in 1855 was made president of the Austrian academy of sciences. In 1861 he entered the House of Peers of the Reichsrath. His principal works are on mechanical science applied to art and industry. His most popular work is the 'Naturlehre,' which has passed through many editions, and was a text-book in all the schools of Austria.

Baumgartner, Herman, German historian: b. 28 April 1825; d. 19 June 1893. He was a professor of history in the University of Strassburg, 1872-89, and published 'Geschichte Spaniens zur Zeit der Franzosischen Revolution' (1861); 'Geschichte Spaniens vom Ausbruch der Franzosischen Revolution bis auf unsere Tag' (1865-71); 'Karl V. und die Deutsche Reformation' (1889).

Baur, bowr, **Ferdinand Christian**, one of the most celebrated theologians of modern Germany, founder of the 'New Tübingen School of Theology'. b. Blaubeuren, where his father was pastor, 21 June 1792; d. 2 Dec. 1860. At the University of Tübingen, which he entered in 1809, he devoted five years to theological studies, and in 1817 became professor in the seminary at Blaubeuren. While holding this position he published his first work, 'Symbolism and Mythology, or the Natural Religion of Antiquity' (1824-5), by which his eminent theological abilities were so clearly manifested that in 1826 he received a call to Tübingen as ordinary professor in the evangelical faculty of that university. This position he continued to occupy till his death. His chief works belong to the two departments of the history of the Christian dogmas and New Testament criticism, in both of which his views have had the most powerful effect upon the theology of the present day. His most important works belonging to the first class are: 'The Christian Gnosis, or the Christian Philosophy of Religion' (1835); 'The Christian Doctrine of the Atonement' (1838); 'The Christian Doctrine of the Trinity and the Incarnation' (1841-3); 'Compendium of the History of Christian Dogmas' (1847). To the second class belong 'The So-called Pastoral Epistles of the Apostle Paul' (1835); 'Paul the Apostle of Jesus Christ, His Life and Labors, His Epistles and His Teaching' (1845); 'Critical Inquiries Concerning the Canonic Gospels, their Relation to One Another, their Origin and Character' (1847). He also wrote the 'History of Christian Doctrine from the Origin of Christianity Down to the End of the 18th Century,' a series of volumes between 1853-63.

Baur, **Frederick Wilhelm von**, Russian military engineer: b. Hanau, Germany, 1735; d. St. Petersburg, 1783. He early adopted a military life, entered the British service in 1755 and in 1757 he obtained the rank of general, and engineer-in-chief. Frederick II. of Prussia ennobled him. In 1769 he entered into the service of Catherine II., empress of Russia, and was employed against the Turks. The empress had a high notion of his talents, and employed him in making the aqueduct of Tsarskoe-Selo, for supplying Moscow with water, and in deepening the canal near St. Petersburg, at the end of which he constructed a large harbor, and completed other important undertakings. Baur had for his secretary the celebrated Kotzebue, who directed in his name the German theatre at St. Petersburg.

Baur, **Gustav Adolf Ludwig**, German theologian: b. Hammelbach, 1816; d. 1889. He was appointed a professor at Giessen in 1847, and in 1870 at Leipsic. He belonged to the Schleiermacher school and was the author of 'Grundzüge der Homiletik' (1848); 'Boëtius und Dante' (1874); 'Die Vorchristliche Erziehung' (1884).

Bause, bow'zě, **Johann Friedrich**, distinguished German engraver: b. Halle, 1738; d. Weimar, 1814. He resided chiefly at Leipsic, where he executed many highly esteemed engravings. He was a member of several academies of fine arts.

Bausman, Benjamin, American Reformed (German) clergyman: b. Lancaster, Pa., 28 Jan. 1824. He founded St. Paul's Reformed Church, Reading, Pa., 1863, and has been its pastor ever since. He has published 'Sinai and Zion' (1860; 7th ed. 1885); 'Wayside Gleanings in Europe' (1876); 'Bible Characters' (1893); 'Catechetics and Catechetical Instruction' (1863); and edited *The Guardian* (1867-82), and *Reformirte Hausfreund* (1882).

Bausset, bō-sā, Louis François (CARDINAL), French ecclesiastic: b. Pondicherry, India, 14 Dec. 1748; d. Paris, 21 June 1824. His father, who held an important position in the French Indies, sent young Bausset to France when he was but 12 years of age. He was educated by the Jesuits, and became bishop of Alais in 1784. Having signed the protest of the French bishops against the civil constitution of the clergy, he emigrated in 1791, but in the following year returned to France, was soon arrested, and imprisoned in the old Convent of Port Royal, where he remained until after the fall of Robespierre. After the restoration of Louis XVIII., in 1815, he entered the Chamber of Peers; the following year he became a member of the French Academy; and, in 1817, he received the appointment of cardinal. He wrote the 'History of Fénelon' (1808-9), at the request of the Abbot Emery, who had in his possession the MSS of the illustrious Archbishop of Cambray. The work had great success, and its author was awarded, in 1810, the second decennial prize of the Institute, for the best biography. His 'History of Bossuet' (1814) was less favorably received.

Bautain, bō-tān, Louis Eugene Marie, French philosopher: b. Paris, 17 Feb. 1796; d. 18 Oct. 1867. He entered the Church, and became a priest in 1828; resigned his professorship in 1830; and later was suspended as a priest because of his work, 'La Morale de l'Evangile comparee a la Morale des Philosophes'; but was reinstated in 1841. He was made dean of the Faculty of Letters at Strassburg in 1838, and subsequently director of the College of Juilly. At a still later period he was transferred to Paris, and made vicar-general of the Metropolitan Diocese. He was also appointed a member of the theological faculty of Paris. His writings include 'Philosophie-psychologie Experimentale' (1839); 'Philosophie Morale' (1842); 'Philosophie du Christianisme' (1835); 'La Religion et la Liberté considerees dans leurs Rapports' (1848); 'La Morale de l'Evangile comparee aux divers Systemes de Morale' (1855), etc.

Bautzen, bowt'sēn, or **Baudissin**, bow'desen, a manufacturing town in Saxony, noted for its production of textile fabrics, leather, paper, etc. It overlooks the River Spree, 30 miles northeast of Dresden, and is encircled by a wall and moat. The cathedral church of St. Peter is used by both Protestants and Roman Catholics, it being divided into two portions for the purpose. The town contains many schools, a museum, art gallery, and three libra-

ries. At Bautzen Napoleon, with 130,000 men, defeated the allied armies of Russia and Prussia, 20-21 May 1813. Pop. (1900) 26,000.

Bauxite, or **Beauxite**, bo'zīt (from **Baux**, or **Beaux**, near Arles, France, where it occurs), a native, hydrated oxide of aluminum, having the formula $Al_2O_3 \cdot 2H_2O$. It has a specific gravity of about 2.5, and its hardness ranges from 1 to 3. It occurs massive, in concretionary grains showing a concentric structure, and in clay-like deposits. Sesquioxide of iron is usually present in considerable quantity,—sometimes to the extent of 50 per cent,—part of it replacing aluminum, and part occurring merely as an impurity. Bauxite is found in many parts of the world. One of the most important deposits is at Irish Hill, near Larne, County Antrim, Ireland, where it occurs in the iron measures together with lignite. At this place three layers of it are known, having an aggregate thickness of about 50 feet. The finest grade from Irish Hill is almost free from iron, containing as little of that metal as good china clay. Analyses have shown that the color of bauxite is no criterion of the freedom of the mineral from iron, since a white variety containing 3.67 per cent of Fe_2O_3 is known, while a certain strongly red variety showed, upon analysis, but 3.75 per cent, and a yellow specimen contained 14.39 per cent. In the United States bauxite occurs in considerable quantities in Saline and Pulaski counties, Arkansas, and in a deposit extending from Calhoun County, Alabama, eastward into Georgia. Bauxite forms the principal ore of the metal aluminum, which is obtained from it by the electrolysis of a solution of bauxite in melted cryolite (see **ALUMINUM**). The American deposits of bauxite are well suited to the production of aluminum, as ore can be had in quantity that contains as little as 1 per cent of iron oxide, and 3 per cent of silica. Bauxite, in some localities, is undoubtedly an alteration product of basaltic rocks, while in other localities (especially in the United States) it has very likely been deposited by hot springs. In addition to its use as an ore of aluminum, bauxite forms an important source of alum. Its clay-like form is known as *wocheinite*, on account of its occurrence at *Wochein*, in Styria. (C. Willard Hayes, 'Bauxite,' 'Sixteenth Annual Report of the United States Geological Survey,' Part 3 (Washington, 1896); Branner, 'The Bauxite Deposits of Arkansas,' 'Journal of Geology,' Vol. V., 1897, p. 263).

Bavaria (German, *Bayern*; French, *Bavière*), a kingdom in the south of Germany, the second largest state of the empire, composed of two isolated portions, the larger comprising about eleven twelfths of the monarchy, bounded on the east by Bohemia and Upper Austria; on the south by Salzburg and the Tyrol; on the west by Würtemberg, Baden, Hesse-Darmstadt, and Hesse-Nassau; and on the north by Hesse-Nassau, Weimar, Meiningen, Reuss, Coburg, and the kingdom of Saxony. It lies between lat 47° 19' and 50° 41' N., and lon. 8° 53' and 13° 50' E. The smaller portion, the Pfalz or Palatinat, lies west of the Rhine, which forms its eastern boundary, and is separated from the main body by Würtemberg, Baden, and Hesse-Darmstadt. It is included between lat. 48° 57' and 49° 50' N.; and lon. 7° 6' and 8° 31' E.; and is bounded south by Alsace-Lorraine,

BAVARIA

west by the Prussian Rhine provinces, and north by Hesse-Darmstadt. Bavaria is estimated to contain an area of 29,286 English square miles, and is divided into eight circles (*kreise*), which were formerly named after the rivers that watered them, but an edict of 29 Nov. 1837, gave the circles new names and new boundaries. The following table shows their names, areas, and populations:

CIRCLES	Area, Sq. M.	Pop. 1900
Oberbaiern (Upper Bavaria) ...	6,456	1,323,447
Niederbaiern (Lower Bavaria) ..	4,152	678,584
Pfalz (Palatinate) ...	2,288	831,533
Oberpfalz (Upper Palatinate) and Regensburg (Ratisbon) ..	3,728	553,857
Oberfranken (Upper Franconia) ..	2,702	607,903
Mittelfranken (Middle Franconia) ..	2,925	815,556
Unterfranken (Lower Franconia) and Aschaffenburg.....	3,243	650,758
Schwaben (Swabia) and Neuburg	3,792	713,515
Total	29,286	6,175,153

The capital is Munich (q.v.), and the other principal cities are Nuremberg, Augsburg, Würzburg, and Regensburg or Ratisbon (qq.v.).

Mountains—Bavaria is a hilly rather than a mountainous country. A large portion, more especially south of the Danube, is a plateau country of considerable elevation, and indeed, the whole of the main portion of the kingdom may be described as an upland valley, averaging about 1,600 feet above the sea-level, intersected by numerous large streams and ridges of low hills. On all sides it is surrounded by hills of a greater or less altitude, either quite upon the frontier or only at small distances from it. The whole southern frontier is formed by a branch of the Noric Alps, offsets from which project far into the southern plateau of Bavaria. Besides numerous peaks which this range contains, varying from 4,000 to 8,000 feet high, the following may be named as being above the latter number. The Zugspitze, 10,394 feet; the Watzmann, 9,470 feet; the Hochvogel, 8,460 feet; the Madeler Gabel, 8,650 feet. Passing along the valley of the Inn and across the Danube, we come to the Bohemian frontier, formed by the Bohmerwald mountains running southeast to northwest and lowering down at the valley of the Eger. The highest peaks in this range are the Rachel, 5,102 feet, and the Arber, 5,185 feet. Crossing the Eger we meet with the Fichtelgebirge, presenting the Schneeberg, 3,750 feet high, and the Ochsenkopf, 3,633 feet. West from this range, and along the frontier of the Saxon ducal territories and Hesse-Cassel, run hills of moderate elevation, under various names, Frankenwald, Rhöngebirge, etc., no peaks of which attain an elevation of more than 3,327 feet. The western mountain boundary of the Bavarian valley is formed north of the Main by the Spessartwald range, and in the kingdom of Würtemberg by the Alb or Alp. The only noteworthy interior ranges are, in the northwest the Steigerwald; and in the northeast, running in a southwesterly direction from the Fichtelgebirge, the Franconian Jura; a low limestone range, containing numerous remarkable stalactitic caves. The Pfalz or Palatinate is traversed by the northern extremity of the Vosges, the highest peak in this locality being the Königstuhl, 2,162 feet.

Lakes.—The lakes of Bavaria are neither very numerous nor of very great extent, though many of them present exceedingly picturesque scenery. The larger are all situated on the upper part of the southern plateau; the smaller within the range of the Noric Alps. The most remarkable of the former are, Lake Ammer, about 10 miles long by $2\frac{1}{2}$ broad, 1,736 feet above the sea; Lake Wurm or Starnberg, about 12 miles long by 3 broad, 1,899 feet; and Lake Chiem, 9 miles long by 9 to 4 broad, 1,651 feet above the sea. Of the smaller, the more remarkable are Lake Tegner, about 3 miles long, 2,586 feet; Lake Walchen, 2,597; and various others upward of 2,000 feet above the sea-level. Most of the lakes are well supplied with fish.

Rivers.—Bavaria belongs wholly to the basins of the Danube and the Rhine, with the exception of a very small portion in the northeast corner, which through the Eger appertains to the basin of the Elbe. The river Danube intersects the main portion of the kingdom west to east nearly in the centre, and before it enters the Austrian dominions at Passau, where it is still 925 feet above the sea, it receives on its right bank the rivers Iller, Lech, and Isar, which have their sources in the Noric Alps, besides numerous smaller streams; and on its left bank, the Wornitz, Altmühl, Nab, and Regen, besides other lesser streams. The Main traverses nearly the whole of the northern part of this portion of the kingdom from east to west, and is navigable for steam vessels from Bamberg to the Rhine. Its principal affluents are the Regnitz and the Saale. In the Palatinate there are no streams of any importance, the Rhine being merely a boundary river.

Climate.—If we except the valley of the Rhine, and the valley of the Main in lower Franconia, Bavaria, even including the Palatinate, is, in comparison with other German states, a cold country. The average temperature of the year is about 47° F., winter, 30°; spring, 47°; summer, 63°; and autumn, 47°.

Soil, Vegetation, etc.—Bavaria is one of the most favored countries in Germany in respect of the fruitfulness of its soil, due, no doubt, in a considerable degree, to the undulating nature of the country, to the numerous streams by which it is watered, and to being nearly wholly composed of Jura limestone. In the plains and valleys the soil is capable of producing all kinds of crops, but not till lately were the natural advantages of the country turned to good account. Ignorance and idleness opposed a barrier to improvement, which it took the utmost efforts of an enlightened government, aided by the general spread of education, to remove. Now a spirit of agricultural enterprise pervades the kingdom, improved methods of cultivation have been introduced, and large tracts of waste land have been reclaimed and brought under the plow. The principal crops are wheat, rye, barley, and oats; but in some districts rice, spelt, maize, and buckwheat are also raised. To these productions of the soil may be added potatoes (the cultivation of which is yearly increasing), tobacco, and fruit, of which large quantities are grown in the valleys of the Main and the Rhine. In the circles of Mittelfranken and Schwaben-Neuburg, the hop plant is cultivated to a considerable extent, the quantity varying from 30,000 to 40,000 hundredweight per annum; and the

BAVARIA

vine in the circles of Pfalz and Unterfranken. The latter produces the Franconian wines; the best wines of the former are produced near Deidesheim and Wachenheim. The celebrated Steinwein and Leistenwein are the produce of the southern slope of the Marienburg, near the town of Wurzburg. The forests of Bavaria, composed chiefly of fir and pine trees, cover nearly a third of its entire surface and yield a large revenue to the state; much timber being annually exported, together with potashes, tar, turpentine, and other products peculiar to these wooded regions. The principal mineral products are salt, coal, and iron. Some of the mining works belong to the state, and contribute something to the public revenue; but the minerals are not wrought to the extent they might be. Coal mining gives employment to between 4,500 and 5,000 hands. Plumbago is found in several places and is principally manufactured into pencils. Porcelain clay of the finest quality likewise abounds in some localities, the best being obtained in the districts of Wunsiedel in the Upper Main. Lithographic stones are another important production. In the rearing of cattle and sheep the Bavarians are somewhat backward. Swine are reared in great numbers in all parts of the country, and poultry and wildfowl are abundant. The wolves and bears with which the forests of Bavaria were at one time infested are nearly extinct.

Manufactures.—The manufactures of Bavaria are singly not very important, being mostly on a small scale and conducted by individuals of limited capital. The principal articles manufactured are linens, woollens, cottons, silks, leather, paper, glass, earthen, iron, and steel ware, jewelry, etc., but the supply of some of these articles is inadequate to the home consumption. Of leather, paper, glass, and iron-ware rather large quantities are exported. The optical and mathematical instruments made at Munich are the best on the Continent, and are prized accordingly. But the most important branch of manufacture in Bavaria is the brewing of beer—the universal and favorite beverage of the country. There are upward of 5,000 brewing establishments in the kingdom, which have been calculated to supply on an average about 20 gallons a year to every individual of the population. The beer, however, is not consumed only in the country of its production, but is sent to all parts of Germany, and even as far as America and India. Spirits are also largely distilled. A large portion of the industrial population maintain themselves by weaving linen, and by the manufacture of articles in wood (some of which are of beautiful workmanship), and by the felling and hewing of timber. Notwithstanding its favorable geographical position and other natural advantages the trade of Bavaria is comparatively limited. Among the exports are corn, timber, wine, cattle, leather, glass, hops, fruit, beer, iron, and steel wares, machinery, fancy articles, colors, lucifer matches, stoneware, etc. Among the imports are coffee, cacao, tea, cotton, tobacco, drugs, copper, oil, spices, dyestuffs, silk and silk goods, lead, etc.

Transportation.—From its position Bavaria enjoys a considerable portion of transit trade, much facilitated by the good roads that traverse the country in all directions. The means of communication are now very complete. The

Danube, the Rhine, the Main, the Regnitz, etc., afford ample scope for inland navigation, besides the König Ludwig Canal, which connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing direct water communication through the Rhine between the German Ocean and the Black Sea. The railway system (now managed as a part of the imperial system of railways) has been carried out on an extensive scale. The lines are partly state property, partly private. The number of miles in operation amounted in 1899 to 4,062, about 3,000 of this total being state railways, the remainder being private enterprises. The amount of debt contracted for railways by Bavaria is \$250,000,000, forming over four fifths of the total debt of the country. The receipts from the railways are now generally sufficient to pay the interest and charges on account of this debt. The state also possesses two canals.

Education and Art.—The Department of Education is under the superintendence of the Superior Board of Education and Ecclesiastical Affairs. A complete system of inspection is established throughout the country; the reports of the inspectors including not only the number and proficiency of the scholars, but also the conduct of the teachers, the state of the buildings, and the nature and extent of the funds available. It is necessary in Bavaria, before admission can be obtained into any higher school, to have passed a satisfactory examination in the lower school. Not only must all candidates for offices under the state pass examinations, but examinations are held of apprentices in trade who wish to become masters, and even of officers in the army on promotion. There are over 8,000 schools in Bavaria, attended by more than 600,000 pupils. Attendance on school is compulsory up to 14 years of age. There are three universities in Bavaria—two of which (Munich and Wurzburg) are Roman Catholic, and one (Erlangen) Protestant. The University of Munich is attended by about 3,500 students, and has about 170 professors and instructors; that of Wurzburg has 80 professors and instructors, and about 1,350 students; and that of Erlangen 67 professors and instructors, and about 1,100 students. There are also several lyceæ, a number of gymnasias, numerous Latin, normal, and polytechnic schools, besides academies of arts and sciences, fine arts, horticulture, etc. The capital, Munich, contains a library of 800,000 volumes, including 25,000 MSS; several scientific and literary institutions, academies, and national societies, and extensive collections of works of art.

Bavaria enjoys the honor of having originated a school of painting of a high order of merit, known as the Nuremberg school, founded about the middle of the 16th century by Albert Dürer, a native of that town, whose works are little, if at all, inferior to those of his great Italian contemporaries. Hans Holbein, who excelled Dürer in portrait, though far behind him in historical painting, is claimed by Bavaria, but neither the precise locality nor the date of his birth is known with certainty—Augsburg, Basel, and Grunstadt being severally named as the one, and the dates 1495 and 1498 as the other. To these celebrated names have been added those of the eminent sculptors Kraft and Vischer, both also Bavarians; the former

BAVARIA

born about 1435 and the latter about the middle of the same century. The masterpiece of the latter distinguished artist is the bronze shrine of St. Sebaldus in Nuremberg, esteemed a marvel of art for beauty of design and delicacy of workmanship. The most celebrated of Kraft's works is the remarkable tabernacle in stone, affixed against one of the columns of the choir of the Church of St. Lawrence, also in Nuremberg. The restoration of Bavarian pre-eminence in modern times, in connection with the fine arts, is, in a great measure, if not entirely, owing to Louis I., whose love of art and liberal patronage have rendered the capital one of the most celebrated seats of the fine arts in Europe.

Religion.—The religion of the state is Roman Catholicism, which embraces more than seven tenths of the population. The remainder are principally Protestants and Jews. The proportion between Catholics and Protestants has scarcely varied during the last three quarters of a century. All citizens, whatever their creed, are equally admissible to the same public functions and employments, and possess the same civil and political rights. The articles of the concordat concluded with the Pope are subordinate in their application to the fundamental law of the state. By an ordinance of Louis I. females are prohibited from pronouncing any monastic vow until after having passed their 33d year. The dioceses of Bavaria comprise two archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstadt, Passau, Wurzburg, and Spire. The salaries are paid by the government. In Bavaria marriage between individuals having no capital cannot take place without the consent of the principal persons appointed to superintend the poor institutions, who, if they grant such liberty where there are no means of supporting the children that may spring from such marriage, render themselves liable for their maintenance. The law is intended to prevent improvident marriages.

People.—In personal appearance the Bavarians are stout and vigorous, well adapted to bear the fatigues of war, and are generally considered good soldiers. They are accused of being indolent and somewhat addicted to drinking, but are brave, patriotic, and faithful to their word. Their manners and customs toward the close of the 18th century were described as very coarse, and they were said to be deeply imbued with superstitious bigotry; but since the more general diffusion of knowledge a great change for the better has taken place. Many of the peasantry wear long, loose, snuff-colored coats, lined or edged with pink, and studded in front with silver or white metal buttons, thrown open to display a smart waistcoat of various and brilliant colors; their hats are often ornamented with artificial flowers. Many of the Bavarian women are handsome, lively and graceful. They dress smartly and display much taste in their attire. Some of them wear black-silk handkerchiefs, decorated with flowers or ribbons, tied tightly round their heads, some caps of silver or gold tissue, and all have their hair neatly braided. German is the language spoken, with local peculiarities; but they have never been conspicuous for the cultivation of their native tongue.

Constitution.—Bavaria was formerly a member of the Germanic Confederation and now forms part of the German empire. The executive is in the hands of the king. The legislature consists of two chambers—one of senators and one of deputies; the former composed of princes of the royal family, the great officers of state, the two archbishops, the heads of certain noble families, a bishop named by the king, the president of the Protestant General Consistory, and any other members whom the king may create hereditary peers; the latter, of members chosen indirectly, one to every 31,500 persons of the total population. The qualifications are that the candidate shall have completed his 30th year, shall be a free and independent citizen, and shall be a member of the Catholic or the Reformed Church and pay direct state taxes. The members are chosen every six years unless the house is dissolved by the king, and are generally convened once a year, but are bound to assemble at least once every three years. Each of the eight circles or provinces has a provincial government consisting of two boards, one for the management of the police, schools, etc., and the other for the management of financial affairs. The revenue for the financial year 1900-1 was estimated at about \$105,000,000, and the public debt, including railway debt, etc., was \$350,000,000. The army is raised by conscription,—every man being liable to serve from 1 January of the year in which he completes his 20th year,—and it forms an independent part of the army of the German empire. In time of peace it is under the command of the king of Bavaria, but in time of war it is placed under that of the emperor of Germany as commander-in-chief of the whole German army. The period of service is three years in the active force, four in the reserve, and five in the landwehr; and no Bavarian can settle or marry, or accept of any definite appointment, till he has fulfilled his military liabilities. On a peace footing the Bavarian army consists in all of fully 63,000 men and 2,600 officers; on a war footing, about twice this number.

History.—The Bavarians take their name from the Boii, a Celtic tribe who inhabited the districts which, when conquered by the Romans, became the Roman provinces of Vindelicia and Noricum. After the fall of the Western Empire this territory was overrun by various Germanic tribes who formed themselves into a confederation like that of the Franks and Marcomanni and called themselves Boiarii. The confederacy of the Boiarii was made tributary first to the Ostrogoths and then to the Franks. Finally the sovereignty over them was assumed by Charlemagne, and on the death of that monarch the kings of the Franks and Germans governed it by their lieutenants, who bore the title of margrave, afterward converted into that of duke, and latterly (1623) into that of elector. In 1070 Bavaria passed into the possession of the family of the Guelphs, and in 1180 it was transferred by imperial grant to Otho, count of Wittelsbach. On the extinction of the direct line of that family in 1777, the elector palatine, Charles Theodore, added the Palatinate and the duchies of Juliers and Berg to the Bavarian dominions. In 1799 the Duke Maximilian Joseph of Deux-Ponts came into possession of all the Bavarian territories. The Peace of Lunéville (9 Feb. 1801) essentially affected Bavaria.

While it lost all its possessions on the left bank of the Rhine, and also the lands of the Palatinate on the right bank, it obtained, on the other hand, by an imperial edict, an indemnification by which it gained, in addition to the amount lost, a surplus of 2,109 square miles and 216,000 inhabitants.

In 1805 Bavaria was raised, by the Treaty of Presburg, to the rank of a kingdom, with some further accessions of territory, all of which were confined by the treaties of 1814 and 1815, by which also a great part of the lands of the Palatinate was restored. In 1848 the conduct of the king of Bavaria, in maintaining an open liaison with Lola Montez, had thoroughly alienated the hearts of his subjects, and quickened that desire of political change which had previously existed. The people, early in March 1848, demanded immediate convocation of the chambers, liberty of the press, public judicial trials; also that electoral reform should be granted, and that the army should take an oath to observe the constitution. The king having refused to grant these demands, tumults occurred, and King Louis announced his resignation of the sceptre to his son, Maximilian II., under whom the reforms and modifications of the constitution were carried out. Maximilian died in 1864 and was succeeded by Louis II. In the war of 1866 Bavaria sided with Austria, in consequence of which it was obliged, by the treaty of 22 August in the same year, to cede a small portion of its territory to Prussia, and to pay a war indemnity of \$12,150,000. Soon after Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein under Prussian regulations. In the Franco-German war of 1870-1 Bavaria took a prominent part, and since 1871 it has been one of the constituent states of the German empire, represented in the Bundesrath by 6, in the Reichstag by 48 members. In 1886 King Louis II. committed suicide through alienation of mind. His brother Otto succeeded, but he being also insane, his uncle, Leopold, became regent.

Ba'viad and Mæviad, *The*, two satires, by William Gifford. It was through these that the author, who later was the first editor of the 'Quarterly Review,' became known. 'The Baviad' (1792) is an attack on a band of English writers, who had formed themselves into a kind of mutual admiration society. It is an imitation of the first satire of Perseus, and in it the author not only attacks the "Della Cruscan," but all who sympathize with them. The 'Mæviad' (1795) is an imitation of the 10th satire of Horace, and was called forth, the author says, "by the reappearance of some of the scattered enemy."

Bavieca, *bā-wyā'kā*, the favorite horse of the Cid.

Bavius, Marcus and Mævius, still notorious as two miserable poets and presumptuous critics, satirized by Virgil. The words are often used to signify bad or malevolent poets.

Bawbee, *bōr-bē'* (French, *bas billon*, "low" or "debased billon"), a coin originally minted in Scotland from an alloy of copper with a very small amount of silver, called billon, and having at different times a value varying from 1½ to 3 cents. The coin is no longer issued, but the term is used in Scotland to mean a half-penny (a cent) or a very small value.

Bax, Ernest Belfort, English socialist: b. Leamington, 23 July 1854. He was educated in London and Germany; followed journalism in Germany as foreign correspondent in 1880-1; and returning to England, became one of the founders of the English socialist movement. In 1885 he aided in starting the Socialist League. He wrote a large number of works on socialistic and historical subjects.

Bax'ter, Andrew, Scotch philosopher and metaphysician: b. Aberdeen, 1686; d. 1750. He was educated at King's College, Aberdeen, and found occupation as a private tutor. About 1733 he published an 'Inquiry into the Nature of the Human Soul; Wherein the Immateriality of the Soul is Evinc'd from the Principles of Reason and Philosophy.' In 1741 he went abroad with two of his pupils, and remained for some years at Utrecht, where he contracted an acquaintance with some of the Dutch *literati*. He returned to Scotland in 1747, and resided at Whittingham, East Lothian, where he died. He was the author of a Latin treatise on the principles of astronomy, entitled 'Matho sive Cosmotheoria, Puerilis Dialogus,' which he afterward translated into English and published in two volumes, 12mo. He was a staunch friend and correspondent of John Wilkes, then quite a young man.

Baxter, James Phinney, American author: b. Gorham, Me., 23 March 1831. A successful merchant and manufacturer; he has been four times mayor of Portland, Me., to which he presented the land and building for a public library. A devoted student of the history of his native State, he has published: 'George Cleeve of Casco Bay' (1885); 'Journal of Lieut. W. Digby' (1888); 'Sir Ferdinando Gorges and His Province of Maine' (1890); 'The Pioneers of New France in New England' (1894). He edited Vols. IV. and V. of the 'Documentary History of Maine' (1889).

Baxter, Jere, American lawyer: b. Nashville, Tenn., 11 Feb. 1852. He traveled in Europe, studied law, and reported the decisions of the supreme court of Tennessee, 9 volumes. He is prominent in railroad enterprises, particularly in schemes devoted to the opening up of the mineral and timber resources of his State. He was president of the Memphis & Charleston R.R. before reaching the age of 30, and he organized and built the Tennessee Central R.R., of which corporation he is president. He has been instrumental in the founding and extension of industrial towns, and is a member of the Tennessee Senate.

Baxter, Lucy E. (BARNES), English art writer: b. Mere, Wiltshire, about 1835; d. Florence, Italy, 10 Nov. 1902. She was the daughter of William Barnes, the Dorset poet, and wrote over the pen name of LEADER SCOTT. After her marriage to Mr. S. T. Baxter in 1867, she resided in Italy, where she was made an honorary member of the Accademia delle Belle Arti. She was the author of 'The Painter's Ordeal'; 'A Nook in the Apennines' (1879); lives of Fra Bartolommeo, Andrea del Sarto, Fra Angelico, and Lucadella Robbia; 'The Renaissance of Art in Italy' (1882); 'Messer Agnolo's Household, a Unique Cento Florentine Story' (1882); 'Ghiberbi and Donatello' (1882); 'A Bunch of Berries' (1883); 'Sculpture, Renaissance and Modern' (1886);

BAXTER—BAY

'Tuscan Studies and Sketches' (1887); 'Life of William Barnes' (1888); 'Vincigliata and Mariano' (1891); 'The Orti Orcellari' (1893); 'Echoes of Old Florence' (1894); 'The Castle of Vincigliata' (1897); 'The Cathedral Builders,' her most important work (1899); 'Filippo di Ser Brunellesco' (1901).

Baxter, Richard, English divine: b. near Shrewsbury, 1615; d. 8 Dec. 1691. After receiving a somewhat desultory and defective education he was sent to London under the patronage of Sir Henry Herbert, master of the revels; but he soon returned to the country to study divinity, and in 1638 received ordination in the Church of England. In 1640 he refused to take the oath of universal approbation of the doctrine and discipline of the Church of England, usually known as the *et cetera* oath, and in the following year he became minister at Kidderminster, with the best results to the morality of the town. When the civil war broke out he sided with the Parliament, and after the battle of Naseby accepted the appointment of chaplain to Col. Whalley's regiment. He is said to have been, the whole of this time, a friend to the establishment, according to his own notions. In 1647 he retired, in consequence of ill health, from his military chaplainship, and when he recovered preached against the Covenant. He even endeavored to persuade the soldiery not to encounter the Scottish troops who came into the kingdom with Charles II., and did not hesitate to express an open dislike to the usurpation of Cromwell. The fact is that Baxter held civil liberty to be of secondary consequence to what he esteemed true religion, and appears, from a sermon preached before Cromwell, to have deemed the toleration of separatists and sectaries the grand evil of his government. After the Restoration he was made one of the king's chaplains and a commissioner of the Savoy Conference to draw up the reformed liturgy. The active persecution of the Nonconformists soon followed; and upon the passing of the act against conventicles he retired, and preached more or less openly as the act was more or less rigidly enforced. After the accession of James II., in 1685, he was arrested for some passages in his 'Commentary on the New Testament' supposed to be hostile to Episcopacy, and was tried for sedition. The violence of Jeffreys, who would hear neither the accused nor his counsel, produced a verdict of guilty on the most frivolous grounds. He was sentenced to two years' imprisonment and a heavy penalty, which, after a short confinement, the king remitted. Henceforward Baxter lived in a retired manner till his death. His wife cheerfully shared all his sufferings on the score of conscience, both in and out of prison. The character of Baxter was formed by his age; his failing was subtle and controversial theology; his excellence, practical piety. In divinity he sought to establish a resting place between strict Calvinism and high-church Arminianism, by the admission of election and the rejection of reprobation. Christ, he considered, died for some especially and for all generally; that is to say, all possess the means of salvation. A body called Baxterians long acknowledged these distinctions; and the Nonconformist clergy, after the Revolution, were divided between this body, the pure Calvinists, and the high-church passive-obedient Arminians. Baxter was a voluminous

writer; his 'Saints' Everlasting Rest,' and the 'Call to the Unconverted,' have been extraordinarily popular. In 1830 an edition of his 'Practical Works' appeared in 23 octavo volumes. The chief authority for the facts of his life is the 'Reliquiæ Baxterianæ' of Sylvester, consisting of autobiographical matter.

Baxter, Robert Dudley, English political economist: b. Doncaster, Yorkshire, 1827, d. May 1875. He was educated at Trinity College, Cambridge, and in 1866 became a member of the Statistical Society of London. He wrote and published 'Railway Extension and Its Results' (1866); 'National Income of the United Kingdom' (1868); 'Taxation of the United Kingdom' (1869); 'English Parties and Conservatism' (1870); 'National Debts of the World' (1871), etc.

Baxter, Sylvester, American journalist: b. West Yarmouth, Mass., 6 Feb. 1850. While on the staff of the Boston *Herald* he was prominent in pushing the metropolitan park system and advocating a "Greater Boston." He has written 'The Cruise of a Land Yacht, a Boy's Book of Mexican Travel'; 'Berlin: a Study in Municipal Government' (1890); 'The Boston Park Guide.'

Baxter, William, American clergyman and author: b. Leeds, England, 1820. He was president of Arkansas College, Fayetteville; when it was burned in the Civil War, he removed to Cincinnati. He has written 'The Loyal West in the Time of the Rebellion' and 'Pea Ridge and Prairie Grove, or Scenes and Incidents of the War in Arkansas' (1864). His 'War Lyrics,' originally published in 'Harper's Weekly' were very popular at the time of their publication.

Baxterians. See BAXTER, RICHARD.

Bay, in *architecture*, a term used to signify the magnitude of a building. Thus, if a barn consists of a floor and two heads, where they lay corn, they call it a barn of two bays. These bays are from 14 to 20 feet long, and floors from 10 to 12 broad, and usually 20 feet long, which is the breadth of the barn. It is also used to denote the divisions of a church or cathedral from floor to roof, as indicated by the pillars or arches, as, a church of eight bays.

In *botany*, the name of several trees and shrubs, as sweet bay (*Laurus nobilis*) the laurel (q.v.) of the poets, used for crowning heroes in ancient times and for church decoration at the present. It has stiff, dull-green leaves sometimes used to flavor culinary dishes. Its sweet, fragrant, aromatic, cherry-like, purple fruits are edible. This tree is widely cultivated for ornament in Europe and America, and is probably the most popular tub-plant used in open-air restaurants, esplanades, etc., on account of its ability to withstand neglect, abuse, and shearing. Several hundred thousand specimens are used annually on the two continents. The bay laurel is better known as the cherry laurel (*Prunus laurocerasus*). Its leaves yield prussic acid, and were at one time extensively used as a poison. The loblolly bay (*Gordonia lissanthus*), white bay (*Magnolia glauca*), and red bay (*Persea carolinensis*), are well-known natives of the southeastern United States. The name rose bay is given to divers evergreen rhododendrons, to oleander, and sometimes to *Epilobium angustifolium*. The California bay-

BAY-BIRDS—BAY WINDOW

tree is *Umbellularia californica*. The bay-tree from which bay rum (q.v.) is distilled is *Myrcia acris*. See LAUREL; MAGNOLIA.

In *geography*, an arm of the sea, extending into the land. It is generally applied to smaller bodies of water than gulfs, of the same general geographical character, though the terms "gulf" and "bay" are used sometimes interchangeably and much to the confusion of geographical science. The word is of Saxon origin and signifies an angle. It should properly be applied only to arms of the sea which are widest at their departure from the main line of sea coast, or mouth, while "gulf" should be applied to such bodies of water as the Gulf of California, whose width is nearly the same throughout a great part of their extent.

Bay-birds, or **Beach-birds**, a sportsmen's name, in particular use along the south shore of Long Island, N. Y., for snipe, curlews, sandpipers, avocets, and other limicoline birds that frequent the shores and bays of estuaries. Compare SHORE-BIRDS.

Bay City, Mich., city and county-seat of Bay County, on the Saginaw River and several railroads; 13 miles north of Saginaw. It is noted for its large steel ship-building plants and its extensive trade in lumber, coal, and manufactured products. The city is the farming, lumbering, and mining trade and wholesale centre for northern Michigan; has two national banks, a number of imposing public buildings, including the United States government building, city hall, Masonic temple, and the First Presbyterian Church; an assessed property valuation exceeding \$10,000,000, and a total debt of about \$700,000. Bay City and West Bay City have many trade, manufacturing, and financial interests in common. They practically form one city, though still under separate governments. Pop. (1900) 27,628.

Bay Islands, Honduras, a group of six islands in the Bay of Honduras, 150 miles southeast of Belize, known as Ruatan, Guanaja (or Bonacca), Utila, Barbareta, Elena, and Morat. They were discovered by Columbus, 30 July 1502, and it was from Guanaja that he first sighted the mainland of America. For many years they were overrun by pirates, and their ownership was long a matter of dispute between Spain and England, and later between England and the republic of Honduras. In 1852 the group was declared a colony of Great Britain by royal warrant, and this action involved the United States in the dispute, that government claiming that the seizure was a violation of the Clayton-Bulwer treaty (q.v.). Negotiations dragged along slowly for several years, but finally Great Britain recognized the claim of Honduras to the islands. A practical protectorate was, however, maintained by Great Britain over the group, and the inhabitants (who number nearly 6,000) avowed British allegiance. In 1903 Great Britain formally renounced all jurisdiction, and title to the Bay Islands is now clearly vested in Honduras. The largest island, Ruatan, is about 30 miles long by 5 miles wide. The group produces all kinds of tropical fruits and has some trade with New Orleans.

Bay of Islands, a large, deep and safe harbor on the northeast coast of the North Island of New Zealand. On it is Koroarika, the first European settlement in New Zealand.

This is also the name of a large bay formed by the Gulf of St. Lawrence, on the west coast of Newfoundland. It abounds in islands, and its fisheries are very important. Pop. of neighboring settlements, 947.

Bay Lagoon, Philippines, a freshwater lake in the northern part of Luzon. This lake is connected with Manila Bay by the Pasig River, and from its centre rises a high volcanic island. It is about 20 miles in extent from north to south, and about 47 miles from east to west. In 1899 it was made a naval headquarters for the gunboat fleet and small craft of the United States in Philippine waters.

Bay Lake, Philippines, a body of water in the northern part of Luzon, connected with Manila Bay by the Pasig River. From its centre rises a high volcanic island. Bay Lake is about 20 miles in extent from north to south, and about 47 miles from east to west. In 1899 it was made a naval headquarters for the gunboat fleet and small craft of the United States in Philippine waters.

Bay Leaves. See BAY (*Botany*).

Bay Psalm Book, the title of the first book published in the American colonies. It was printed by Stephen Daye at Cambridge, 1640, and was the product of the joint labors of Revs. Richard Mather, Thomas Wilde, and John Eliot. It was revised in 1650 and was long in use in New England. The compilers' preface declares they "attempted conciseness rather than elegance, fidelity rather than poetry," and the result of their pious efforts is an astoundingly crude, harsh, metrical version of the Psalms wholly devoid of literary merit. See Tyler, 'History of American Literature'.

Bay Rum, an aromatic mixture of the oil of bay (from *Myrcia acris*) with some other volatile oils, alcohol, and water. It was formerly distilled from a rum made of the leaves and branches.

Bay Salt, the coarse-grained salt found in salt-marshes and along ocean shores, where it is formed by the spontaneous evaporation of sea-water. The name is supposed to refer to the Bay of Biscay.

Bay Shore, N. Y., village in Suffolk County, on Long Island, 41 miles from New York city. It is on the Great South Bay and on the Long Island R.R., and has graded schools, churches, banks, electric lights, waterworks and numerous large summer hotels. It has several yacht clubs and is a popular resort for fishermen. Pop. (1900) 3,130.

Bay State, the popular name of Massachusetts, which prior to the adoption of the United States' Constitution had been known as the Massachusetts Bay Colony.

Bay Window, or **Bow Window**, a window projecting beyond the line of the front of a house, generally either in a semi-hexagon or semi-octagon. Strictly speaking, a bay window rises from the ground or basement, while an oriel is supported on a corbel or brackets, and a bow window is always a segment of an arch; but in ordinary use these distinctions are seldom accurately observed, all three words being used as synonyms.

BAYA — BAYARD

Bayá, or **Bayá Sparrow**, a sparrow-like weaver-bird (*Ploceus philippinus*), which the people of India and the Malay countries often keep about their houses, not only in cages, but as a free pet trained to do a variety of clever tricks, even to find small articles, to carry notes to certain places, and to steal ornaments from the hair of visitors. See **WEAVER BIRD**.

Bayad, a cat fish, *Bagus bayad*, a large edible fish found in abundance in the river Nile; distinguished, however, from the electric cat-fish of the same waters.

Bayaderes, ba-ya-därz, in the East Indies, young girls, from 10 to 17 years of age, who are instructed in dancing, singing, and acting little plays. They are trained under the care of women, who are experienced in all female arts, and particularly in that of pleasing. These procure from the lowest classes of the people the most beautiful girls, of seven or eight years of age, and instruct them in all the arts of their profession (especially dancing and singing), the object of which is to amuse the rich and minister to their passions. Their presence is considered necessary even at the smallest public entertainments, though they are known to be mere prostitutes. After their 17th year, when their first charms have faded, they retire to a pagoda under the protection of the Brahmins, who scruple not to pocket the gains of their prostitution. This word is from the Portuguese word *bailadeira*, from *bailar*, to dance.

Bayamo, ba-ya'mō, Cuba, a town whose name is indissolubly connected with the Ten Years' war and the revolution of 1895. Thus the Cuban national air received the name 'Bayamese Hymn'. The republican movement of 1808 originated here and in the neighboring town of Yara; and here Gen. García received the message that Lieut. Rowan delivered to him before the war of 1898 between the United States and Spain. Bayamo was founded in the early years of the Spanish conquest. It is situated on an affluent of the Canto, Cuba's largest river, in the province of Santiago.

Bayard, bi'ard, **George Dashiell**, American soldier: b. Seneca Falls, N. Y., 18 Dec. 1835; d. 14 Dec. 1862. Passing his boyhood in Iowa, he entered West Point, 1852, and became a cavalry lieutenant; then captain in August 1861, colonel of volunteers in September, brigadier-general the following April, and after serving in the Shenandoah and northern Virginia campaigns, was mortally wounded at Fredericksburg.

Bayard, **James Asheton** (1st), American statesman: b. Philadelphia, 28 July 1767; d. 6 Aug. 1815. He was the son of Dr. James A. (see **BAYARD FAMILY**); was adopted by his uncle, Col. John (q.v.), graduated at Princeton, 1784; studied law, and settled in Wilmington, Del., permanently. In 1796 he was elected (Federalist) Representative in Congress and became the leader of the party in the House, noted as a constitutional lawyer; and when the peculiar system of presidential elections at that time had tied Jefferson and Burr for the presidency, though Jefferson was the only one really voted for, Bayard threw his vote for Jefferson and elected him as the less obnoxious of the two. John Adams appointed him minister to France, but he declined. He served in the House till 1803; in 1804 he was elected to the

Senate, and held the seat till 1813, voting against the War of 1812. He was made peace commissioner in 1813 by Madison, and, declining the ministry to Russia, was one of those who concluded the Treaty of Ghent, December 1814, but died shortly after his return.

Bayard, **James Asheton** (2d), American statesman, son of the foregoing: b. Wilmington, Del., 15 Nov. 1799; d. there, 13 June 1880. He became a lawyer of high rank in Wilmington, United States attorney for Delaware under Van Buren, and was elected United States senator, 1851, 1857, and 1863, as a Democrat; but on the last occasion the "iron-clad" oath of allegiance being required of public officers at that time, Mr. Bayard entered a protest against it as a violation of State rights, and resigned his seat at once on taking it. His successor, George R. Riddle (q.v.), dying four years later after the war, he accepted an election to fill out his own unexpired term, to March 1869; during most of the time was chairman of the Judiciary Committee, and gained an honorable celebrity for his punctilious sense of public honor in the matter of the Credit Mobilier (q.v.). His son, Thomas F. (q.v.), was chosen to succeed him by the same legislature which had elected himself, the only instance of the kind in American history. He lived quietly at Wilmington during the remainder of his life.

Bayard, **John**, American patriot: b. Bohemia Manor, Md., 11 Aug. 1738; d. 7 Jan. 1807. (For his descent, see **BAYARD FAMILY**.) He was a prominent Philadelphia merchant, member of the Sons of Liberty, and later of the Provincial Congress, 1774-5, and of the Council of Safety; colonel of infantry at the battles of Brandywine, Germantown, and Princeton; member of the State board of war, and speaker of its House. He furnished arms to Congress and fitted one of the earliest efficient privateers. In 1785 he was elected to Congress. Somewhat impoverished by his sacrifices in the Revolution, he removed permanently to New Brunswick, N. J., where he was mayor, county judge, and leading magnate. He was a firm Federalist, of high character.

Bayard, **Nicholas**, American colonial official: b. Alphen, Holland, about 1644; d. New York, 1707. (See **BAYARD FAMILY**.) He was double nephew of Peter Stuyvesant, by blood and marriage; became his private secretary and surveyor of the province, secretary of it after the English conquest, and mayor in 1685. He was commander-in-chief of the militia of the province, and one of the three resident councilors; and had to flee to Albany for his life on Leisler's usurpation after Andros' overthrow, but was made councilor anew on Leisler's downfall. On Kidd's arrest for piracy in 1699, Bayard, like all Gov. Bellomont's officials, was accused of complicity, and visited London to clear himself; but the old hates of the Leisler time pursued him, and on charge of attempting to introduce popery, piracy, and slavery into New York he was condemned to death for high treason. William's death intervening, however, he was released and restored to his possessions by an order in council.

Bayard, **bă-yâr**, **Pierre du Terrail** (**CHEVALIER DE**), French soldier: b. Château Bayard, near Grenoble, 1475; d. 30 April 1524. He was descended from one of the most noble families

BAYARD

in Dauphiny, and at the age of 13 became page to the Duke of Savoy, at that time an ally of France. Charles VIII., struck by his skill and grace in riding, asked that he be transferred to his service, and accordingly, as a preparation to being attached to the royal suite, young Bayard was placed in the household of Paul of Luxembourg, Count de Ligny, where he was taught all the feats of arms and niceties of chivalry which were then held necessary to constitute a gentleman and a soldier.

His first experience in war was in the wild and daring march of Charles VIII., with a small unsupported army, through the whole length of Italy, to invade the kingdom of Naples, which was won and lost in a few days with equal ease; and in that campaign, he greatly distinguished himself, taking, with his own hand, a stand of colors in the battle of Verona. After this, while serving in an invading army in Italy, after a battle fought near Milan, in the heat of pursuit he entered that city pell-mell with the fugitives, and was made prisoner, but, in consideration of his astonishing valor, was sent back without ransom by Ludovico Sforza, together with his horse and arms. In Apulia he defeated a Spanish corps commanded by Alonzo de Soto-Mayor, who broke his parole and slandered Bayard, in return for which the latter challenged and slew him in single combat, and afterward covered the retreat of the whole French army, and defended the bridge over the Liris, now the Garigliano, single-handed against half an army. For this feat he received an augmentation of his armorial bearings, a porcupine bristling with spears, with the motto *Vires agminis unus habet*.

A real type of the ideal knight-errant of romance, wherever honor was to be won or danger incurred, Bayard was there. Desperately wounded in the assault of Brescia, he was carried to the house of a nobleman who had fled, abandoning his wife and daughters to the fate which befalls women in a sacked city, and from which the wounded enemy alone preserved them. Half-recovered from his wounds, he joined Gaston de Foix before Ravenna, where with his own hand he took two Spanish standards and converted a retreat of the enemy into a rout. In the subsequent wars with Ferdinand the Catholic of Spain he displayed the same chivalric valor and the same generalship among the Pyrénées which he had displayed in his boyhood among the passes of the Alps and Apennines. In the dark days which clouded the latter years of Louis XII., when Henry VIII. brought his English archers to back the German Maximilian in Flanders, and Térouanne and Tournay went down, with but feeble resistance, before the allies, Bayard was the same in adverse as he had been in prosperous fortunes. Made prisoner at the disgraceful battle of the Spurs, it was again his glory to be taken under circumstances of such honor that, once more, he was dismissed, with his horse and arms, unransomed. It was, however, in his noon of manhood that his glory shone the brightest. When Francis I. invaded Italy after his accession to the throne of France, it was Bayard who was the precursor of his march; who made Prosper Colonna, at the very moment of his belief that he had ambushed and surprised him, his prisoner: who, in a word, paved the king's way to the magnificent battle of Marignano. In that

tremendous conflict, he did prodigies, and more than any or all beside to change what once seemed a lost fight into a victory. At its close his sword conferred the accolade on the shoulder of his king, Francis I., who deemed it honor enough to take knighthood at the hand of such a paladin as Bayard. The fortunes of war, proverbially fickle and changeful, were never more so than at this epoch; and when, a short time later, Charles V. invaded Champagne, his wonderful defense of the open town of Mézières alone prevented his penetrating to the heart of France, of which, by this exploit, he deserved, as he obtained, the name of savior. His next war was his last. Genoa, ever an unwilling conquest of the French arms, revolted; and, under the command of Bonnavet, Bayard was sent to reduce the city to obedience and chastise the rebels. In the first instance success attended their advance; but, after the surrender of Lodi fortune again changed, and, foot by foot, the French were beaten out of their conquests. In retreating through the Val d'Aosta the French rear was beaten, Bonnavet was severely wounded, and the safety of the army was committed to Bayard, if he perchance might save it. In passing the river Sesia in the presence of a superior enemy, as Bayard was covering the rear and pressing hard upon the Spaniards, who were fast giving way before his impetuous charge, he was shot through the right side by a stone from an arquebus, which shattered his spine. "Jesu, my God!" he cried, "I am a dead man." And then commanding that he should be placed erect, in a sitting posture, with his back against a tree, with his face to the Spaniards, and the cross-hilt of his sword held up as a crucifix before him, he confessed his sins to his esquire, sent his adieux to his king and country, and died in the midst of weeping friends and admiring enemies. With his fall the battle was ended. The French lost everything,—standards, drums, baggage, ordnance,—and their retreat to France became a flight. But there was most grief that they had lost Bayard. His body remained in the hands of the Spaniards; but they embalmed and returned it to France unsolicited. A simple bust, with a brief and modest Latin inscription, in the church of the Minorites, in Grenoble, erected in 1823, is the only monument to one of the purest and most beautiful characters in mediæval history, the *chevalier sans peur et sans reproche*.

Bayard's life was written by Symphorien Champier in 1525, and two years later by his secretary, Jacques Joffrey, known as the "loyal servitor." Other accounts have been translated by E. Walford (London, 1867).

Bayard, Richard Henry, American senator, elder brother of James A. (2d) b. Wilmington, Del., 1796; d. 4 March 1868. He graduated at Princeton, 1814, and became a lawyer in Wilmington. He was United States Senator 1836-45, resigning for a few weeks in 1839 to be chief justice of Delaware, but accepting an immediate re-election; then chargé d'affaires at Brussels 1850-3. Returning, he lived in Philadelphia till his death.

Bayard, Samuel, American jurist, son of Col. John: b. Philadelphia, 11 Jan. 1767; d. 12 May 1840. He was valedictorian at Princeton, 1784, and practised law in Philadelphia till 1791, when he was made clerk of the United States

BAYARD — BAYER

supreme court. From 1794 to 1798 he was in London as agent to prosecute American claims before the British admiralty court; after his return was presiding judge of Westchester County till 1803, lawyer in New York 1803-6, then removed permanently to Princeton, N. J. He was one of the founders of Princeton Theological Seminary, the American and New Jersey Bible societies, and the New York Historical Society.

Bayard, Thomas Francis, American statesman, son of James A. (2d): b. Wilmington, Del., 29 Oct. 1828; d. 26 Sept. 1898. He was intended for a business career, and was placed in a New York house, his elder brother being designed to carry on the family succession for public life; but, the latter dying in 1848, Thomas returned to Wilmington, studied law with his father, and was admitted to the bar in 1851. He was appointed United States district-attorney, but resigned the next year; removed to Philadelphia 1855 and practised law two years, then returned permanently to Wilmington. He and his father were peace Democrats, unalterably opposed to the war, publicly denounced it, and gave no help to its prosecution. Elected to the Senate to succeed his father, he took his seat 4 March 1869, and served by successive re-elections till 1885. He was one of the leading Democratic figures, member of the Finance, Judiciary, and other important committees, and its president *pro tem.* in 1881; was on the Electoral Commission of 1876; continued to champion the party doctrines, and was one of the most prominent candidates for the presidency before both Democratic national conventions of 1880 and 1884. On 4 March 1885 he was appointed secretary of state in the Cabinet of President Cleveland; and in this position had his share of important and vexatious questions, such as the Bering Sea seal-fishery matter, and treaties with Great Britain and Russia. He was United States ambassador to Great Britain 1893-7, in Cleveland's second term, the first British minister to hold the title of ambassador.

Bayard Family, a remarkable succession of American public leaders, statesmen, and jurists, identified for two and a half centuries with the Middle States from New York to Maryland, and for a century and a quarter almost continuously in public service. They descended from a family of French Huguenot refugees, whose ancestor was a Paris theological professor driven to Holland to escape persecution about 1580. His son Samuel became a wealthy Amsterdam merchant and married the accomplished, energetic, and capable sister (Anna) of Peter Stuyvesant, the last governor of the Dutch New Netherlands, who himself married Bayard's equally accomplished sister Judith, a great lady of her time. Samuel died in Holland; and his widow with her three sons accompanied her brother to Manhattan Island, where she took up an estate of 200 acres, including the site of the Astor Library. Of these sons, Nicholas became secretary of New Netherlands and later of English New York, mayor, commander-in-chief of the colony's militia, and practically the head of the colony—a perilous honor which twice brought him to the verge of destruction. His brother Peter, however, though not personally conspicuous, became the ancestor of the distinguished Bayards of the 18th and

19th centuries. Peter's son Samuel joined the Labadists (see LABADIE, JEAN), a sect of communists otherwise much like the Quakers, and removed to Maryland. Of his grandsons, Col. John was a leading Philadelphia merchant, patriot, and soldier, representative in Congress, a county magnate in Maryland till after the Revolution, later judge and Federalist pillar; his son Samuel, lawyer, clerk of the supreme court, United States claim agent, and judge, was one of the founders of the New York Historical Society and the American Bible Society. Col. John's twin brother, Dr. James A., was father of James A., the noted Federalist statesman of Jefferson's and Madison's time, leader of the Federalists in the House of Representatives, and the one whose vote gave the presidency to Jefferson instead of Burr, senator, and peace commissioner. The two sons of the latter James A., Richard H. and James A. (2d), were both United States senators of distinction from the State of Delaware, the one a Whig and the other a Democrat—the only instance of the kind in United States history; the former also chosen chief justice of Delaware. The son of James A. (2d), Thomas F., was also senator to succeed his father; so that father, two sons, and grandson represented Delaware in the Senate 47 years between 1805 and 1885. Thomas F. was further a member of the Electoral Commission of 1876, and secretary of state under Cleveland. This unique record of distinguished public position is the more notable that it has been on the highest plane of public character as well as capacity—conspicuous for dignity, probity, and scrupulous sense of those official proprieties which shun the appearance of evil and therefore bar out its reality.

Bayazid, or **Bayezed**, Turkey in Asia, a town in the pashalic of, and 140 miles southeast from Erzerum, southwest of Mount Ararat, from the base of which it is separated by a lava-covered plain 10 miles wide. It is situated on the declivity of a rugged eminence, the summit of which is fortified and surrounded by a wall and ramparts. The town is in a ruinous state; most of the houses are small and ill built, and the streets are extremely filthy. Besides the extensive palace of the pasha, the town contains two Christian churches, three mosques, and the famous monastery of Kara-Keleeseh, celebrated for its beautiful architecture and antiquity. The inhabitants consist chiefly of Kurds and Armenians. Kurdish is the common language of the place. Some trade is carried on with Persia, on the frontiers of which the town is situated. It was occupied and held by the Russians for a time in 1877. Pop. 5,000

Bayazid, bā-yā-zēd', I. and II. See BAJAZET.

Baybay, bāi'bāi, Philippines, a town of the province of Leyte, situated on the west coast, 40 miles southwest of Tanaban. Pop. 17,367.

Bayberry. See CANDLE BERRY.

Bayer, bi'ēr, Gottlieb Siegfried, German philologist, grandson of Johann Bayer: b. Königsberg, 1694; d. St. Petersburg, 21 Feb. 1738. He displayed from his earliest childhood a singular passion for Chinese and other Eastern languages. He studied the Coptic at Berlin, under La Crosse, Arabic at Halle, under Solomon Negri, and at the same time opened a correspondence with the missionaries in India,



THOMAS F. BAYARD.

in order to obtain more information about the Sanskrit and Hindustanee. On the foundation of the academy of sciences in St. Petersburg in 1726, he became professor of Greek and Roman antiquities. Besides his extraordinary knowledge of languages, Bayer was an eminent historical and archæological scholar. His monument is his work published in 1730, 'Museum Sinicum, in quo Sinicæ linguæ et literaturæ ratio explicatur,' containing a Chinese grammar, a grammar of the dialect of Shin-Shu, and many interesting notices on Chinese literature.

Bayer, Johann, German astronomer. b. Augsburg, 1572; d. 1660. He is celebrated for a large work published in 1603, under the title of 'Uranometria,' and republished in 1627 under the title of 'Cœlum Stellatum Christianum,' which contains a minute description and a catalogue of the constellations. He changed the name because he had withdrawn the heathen names of the constellations, and supplied their names by others taken from the Bible, taking those of the northern constellations from the New, and those of the southern constellations from the Old Testament, and giving the names of the 12 apostles to the signs of the zodiac. His letters were adopted by Flamsteed and others, and are now universally used, but the heathen names have kept their ground. He contributed much to the simplification of astronomical science, by avoiding the old unintelligible nomenclature and by denoting the stars in every constellation by the letters of the Greek alphabet in their order. Bayer was also a good student of law and an able theologian. He was settled as minister over different parishes, and so zealous in his advocacy of Protestantism that he was called "Os Protestantium." The Emperor Leopold ennobled him.

Bayer, Karl Robert Emerich von, German novelist, who wrote under the pseudonym of ROBERT BYR: b. Bregenz, 15 April 1835. He is a very popular and exceedingly prolific storyteller, and his voluminous fictions have had a wide circulation. Among his best-known novels are 'The Struggle for Life'; 'Masks'; 'A Secret Dispatch'; 'The Road to Fortune'; 'Meadow Maidenhair'; 'The Ironworm.'

Bayeux, bâ-ye, an ancient town of France, department Calvados, about 16 miles northwest of Caen. It possesses many antique houses of singular appearance, and has a beautiful cathedral dating from the 12th to the 15th century, and having a crypt under the choir several centuries earlier. Its noble portal and three towers render it especially noteworthy. The local industries include the manufacture of porcelain and lace, bonnet-making and cotton spinning. There is a public library and museum, in which one of the most interesting relics of the Middle Ages is preserved. See BAYEUX TAPESTRY. Pop (1896) 7,900.

Bayeux Tapestry, a celebrated piece of mediæval embroidery of sewed work originally found in the cathedral of Bayeux, in the library of which town it is still preserved. The fact that such a tapestry existed was brought to light by M. Lancelot, who communicated a description of an illuminated drawing of a portion of it to the Academy of Inscriptions and Belles-lettres in 1724. This led to the discovery of the tapestry itself in 1728, whereupon various speculations arose as to its date, its origin, and

its purport. According to tradition it is a contemporary representation of the invasion and conquest of England by the Normans, and the discussions upon it have proved that tradition is right. It is thus not only valuable as a relic of the art of the Middle Ages, but it has also great historical value, inasmuch as it supplies several details of the great event which it portrays which are not found in the chroniclers, and also gives us an exact picture of Norman costumes and manners. It contains 1,512 figures with inscriptions in Latin giving the names and subjects. It is supposed to have been worked by the needle of Matilda, queen of William the Conqueror, assisted by her attendants, and to have been presented by Odo, bishop of Bayeux, the half-brother of William, to the church in which it was found. Whether this be so or not, it is regarded as certain that the tapestry is not later than the 11th century. During the French Revolution the tapestry was in great danger of being destroyed. In 1803 it was removed to Paris by order of Napoleon, and when he was meditating the invasion of Britain he caused it to be carried from town to town and exhibited between the acts in the theatres. It was brought back to Bayeux in 1804, when it was placed in the hôtel de ville, instead of the cathedral, its former resting-place. The length of the tapestry is 230 feet, and its height 20 inches. It is in an excellent state of preservation. There are good representations of it produced photographically. Consult J. C. Bruce's 'Bayeux Tapestry' (1885). See TAPESTRY.

Bayfield, Matthew Albert, English clergyman. b. Edgbaston, 17 June 1852. He was educated at the King Edward's School, in Birmingham, and at Clare College, Cambridge; was assistant master in the Blackheath School, 1875-9, and in Marlborough College, 1879-81; headmaster's assistant in Malvern College, 1881-90; headmaster of Christ College, Brecon, 1890-5, and headmaster of Eastbourne College, 1900. He published editions of 'Ion, Alcestis, and Medea,' and also 'Septem contra Thebas' (with Dr. Verrall); 'Iliad' (with Dr. Leaf); 'Latin Prose for Lower Forms,' etc.

Bayle, bâl, Pierre, French critic and philosopher: b. Carlat, near Foix (Languedoc), 1647; d. Rotterdam, 28 Dec. 1706. At the age of 19 he entered the College of Puy-Laurens, to finish his studies. All books were eagerly devoured by him; his taste for logic led him particularly to study religious controversies, but Amyot's 'Plutarch' and 'Montaigne' were his favorite works. In Toulouse he studied philosophy with the Jesuits. The arguments of his professors, and still more his friendly discussions with a Catholic priest who dwelt near him, confirmed his doubts of the orthodoxy of Protestantism, so that he resolved to change his religion. His family, however, tried all means to regain him, and after 17 months he returned to his old faith. To escape from the punishment of perpetual excommunication which the Roman Catholic Church then pronounced against apostates, he went to Geneva, and thence to Copet, where Count Dohna intrusted him with the education of his sons, where he studied the philosophy of Des Cartes. But after some years he returned to France and settled in Rouen, where he was employed in teaching. In 1675 he obtained the philosophical chair at

BAYLEN — BAYLISS

Sedan, where he taught with distinction until the suppression of this academy in 1681. He was afterward invited to discharge the same duties at Rotterdam. The appearance of a comet in 1680 induced him to publish, in 1682, his '*Pensées Diverses sur la Comète*,' in which he discussed various subjects of metaphysics, morals, theology, history, and politics. It was followed by his '*Critique Générale de l'Histoire du Calvinisme de Maimbourg*.' This work, received with equal approbation by the Catholics and Protestants, and esteemed by Maimbourg himself, excited the jealousy of his colleague, the theologian Jerieu, whose '*Refutation du P. Maimbourg*' had not succeeded, and involved Bayle in many disputes. He afterward undertook a periodical work, '*Nouvelles de la République des Lettres*,' in 1684.

The death of his father and of his two brothers, together with the religious persecutions in France, induced him to write his '*Commentaire Philosophique*' on the words of the Gospel: "Compel them to come in"; which is not equal in merit to his other works. Bayle himself was unwilling to acknowledge it; but Jerieu, who probably recognized its author by the zeal with which toleration is defended in this work, attacked it with violence, and his influence was sufficient to lead the magistrates of Rotterdam to remove Bayle from the office in 1693.

He now devoted all his attention to the composition of his '*Dictionnaire Historique et Critique*,' which he published in 1696. This was the first work which appeared under his name. Jerieu opposed him anew, and caused the consistory, in which he had the greatest influence, to make a severe attack upon him. Bayle promised to remove everything which the consistory deemed offensive; but finding the public had other views, and preferring the satisfaction of his readers to that of his judges, he left the work, with the exception of a few trifles, unaltered. He found two new enemies in Jacques Le Clerc, who both attacked his religion: others persecuted him as the enemy of his sect and his new country.

The best editions of his '*Dictionnaire Historique*' are that of 1740, in 4 volumes folio (Amsterdam and Leyden), and that in 16 volumes, published 1820-4 at Paris.

Baylen, bī-lān', or **Bailen**, a town of Spain, province of Jaen, at the foot of the Sierra Morena, 22 miles north of Jaen. It commands the road leading from Castile into Andalusia, and derives its celebrity from the events which took place in its vicinity leading to the "Capitulation of Baylen," signed 20 July 1808, when Gen. Dupont, and about 20,000 French troops under his command, surrendered to the Spaniards on condition of their being conveyed to France by the Spanish government; but the latter stipulation was not carried into effect. The incapacity of Dupont was mainly instrumental in bringing about this result, which inspired the Spaniards with confidence, and was always regarded by Napoleon as the principal source of the French disasters in the Peninsula. Pop. (1887) 8,580.

Bayley, James Roosevelt, American theologian: b. New York, 23 Aug. 1814; d. Newark, N. J., 3 Oct. 1877. He studied at Trinity College, Hartford, and became a minister of the Protestant Episcopal Church; but,

in 1842, was converted to the Roman Catholic faith; and, after studying at Paris and Rome, was ordained a priest in 1844. He accepted the chair of belles-lettres at St. John's College, Fordham, and was its acting president in 1846. After serving as secretary to Archbishop Hughes, he was consecrated the first Bishop of Newark, N. J., in 1853. In 1872 he became Archbishop of Baltimore, Md. He was the founder of Seton Hall College and several other institutions. His '*Pastorals for the People*,' and '*History of the Catholic Church on the Island of New York*,' are his chief writings.

Bayley, Richard, American physician: b. Fairfield, Conn., 1745; d. Staten Island, N. Y., 17 Aug. 1801. After studying medicine in England, chiefly in the London hospitals and under Dr. Hunter, he returned to America in 1776 as a surgeon in Gen. Howe's army, but settled in New York the following year. He was the first professor of anatomy in Columbia College (1792), and for a time health officer of the port of New York, where his vigorous advocacy of proper quarantine laws was finally successful. A careful student of his profession, he suggested a new method of treatment for croup, and maintained (1797) that in its origin, yellow fever was due to local causes and was not contagious. He published '*Cases of the Angina Tracheatis, with the Mode of Cure*' (1781); '*Essay on the Yellow Fever*' (1797); '*Letters on Yellow Fever*' (1798).

Bayley, William Shirley, American geologist: b. Baltimore, Md., 10 Nov. 1861. He graduated at Johns Hopkins in 1883, and since 1887 has been assistant geologist of the Lake Superior division of the United States Geological Survey, and since 1886 associate editor of the '*American Naturalist*.' He is the author (with Prof. C. R. Van Hise) of the '*Report on the Geology of the Marquette Iron District of Michigan*' and has been a frequent contributor to scientific journals.

Baylies, bā'liz, Francis, American statesman, member of Congress from Massachusetts for several sessions: b. 1784; d. Taunton, Mass., 28 Oct. 1852. In the presidential contest which finally resulted in the election of John Q. Adams, he threw the only electoral vote for Jackson that was given from New England. He was for a short time minister to Brazil. He published in 1828 a history of the old colony of Plymouth.

Bayliss, Clara Kern, American author: b. near Kalamazoo, Mich., 5 March 1848. She was married to Alfred Bayliss in 1871, and has published '*In Brook and Bayou*' (1897); '*Lolami, the Little Cliff Dweller*' (1901).

Bayliss, Jeremiah Henry, American Methodist Episcopal clergyman: b. Wednesbury, England, 20 Dec. 1835; d. Bay View, Mich., 14 Aug. 1889. He was educated at Genesee College, N. Y., and was prominent as pastor of Park Avenue and Trinity churches, Chicago; Robert Park and Trinity churches, Indianapolis; Central Church, Detroit; and Walnut Hills Church, Cincinnati. He edited the '*Western Christian Advocate*' in 1884 and 1888.

Bayliss, Sir Wyke, English artist: b. Madeley, 21 Oct. 1835. He was educated by his father and at the Royal Academy, and has been

BAYLOR—BAYNES

president of the Royal Society of British Artists since 1888. His paintings include 'La Sainte Chapelle' (1865); 'St. Mark's, Venice' (1880); 'St. Peter's, Rome' (1888); 'The Cathedral, Amiens' (1900); 'The Golden Duomo, Pisa' (1892), etc. His publications include 'The Witness of Art' (1876); 'The Enchanted Island' (1888); 'The Likeness of Christ Rex Regum' (1898); 'Five Great Painters of the Victorian Era' (1902).

Baylor, Frances Courtenay. See BARNUM, F. C. B.

Baylor, Robert Emmett Bledsoe, American lawyer: b. Lincoln County, Ky, 10 May 1793; d. Gay Hill, Tex., 6 Jan. 1874. In the War of 1812 he served under Col. Boswell and took part in the engagement near Fort Meigs. Admitted to the bar in Kentucky, he later removed to Alabama (1820), acquired a large practice, and became prominent in politics, being a representative in Congress, 1829-31. Later he emigrated to Texas, then a republic, and was a district judge for 25 years. A loyal member of the Baptist denomination, he gave largely in money and land to establishing one of its colleges at Independence (1845), and in recognition of his munificence it was named Baylor University (q.v.).

Baylor University, a co-educational institution in Waco, Tex., controlled by the Baptist Church. It was founded in 1845 on a charter granted by the republic of Texas, and named for Robert E. Baylor (q.v.). Its first location was in Independence, Tex.; it was provided with a university course in 1851; in 1861 President Burleson (who had been its head for 10 years) and the entire faculty resigned and organized a university in Waco, Tex., giving it the name of that city. The two institutions were consolidated in 1882, the earlier one being removed to Waco, and President Burleson continuing at the head of the institution. At the close of 1901 the university reported: Professors and instructors, 47; students, 436; volumes in the library, 11,000; grounds and buildings valued at \$200,000; benefactions, \$82,100; income, \$125,000; number of graduates, 660.

Bayly, Ada Ellen, a popular English novelist, best known as EDNA LYALL: b. Brighton, about 1859; d. Eastbourne, 9 February 1903. She has written 'Won by Waiting' (1879); 'Donovan' (1882); 'We Two' (1884); 'In the Golden Days' (1885); 'Knight Errant' (1887); 'Autobiography of a Slander' (1887); 'Derrick Vaughan, Novelist' (1889); 'A Hardy Norseman' (1889); 'Doreen' (1894); 'How the Children Raised the Wind' (1895); 'Autobiography of a Truth' (1896); 'Wayfaring Men' (1897); 'Hope the Hermit' (1898); 'In Spite of All' (1901); 'The Hinderers' (1902), etc. Although her novels are decidedly romantic, their aim is to depict the development of character.

Bayly, Lewis, Welsh prelate: d. 26 Oct. 1631. He was the author of 'The Practice of Piety,' a very popular religious book which had great influence on Bunyan. It not only passed through many English editions, but was also translated into the Indian language by John Eliot, and was used by him in his work among the Indians.

Bayly, Thomas Haynes, English songwriter and author: b. Bath, England, 13 Oct. 1797; d. London, 22 April 1839. He began the study of law under his father, and later went to St. Mary Hall, Oxford, in order to prepare for the Church; but abandoned both and devoted himself to literature. He gained great popularity with some songs, and several dramas and novels by him also hit the public taste. With Henry Bishop he published 'Melodies of Various Nations.' Among his songs some of the best-known are: 'I'd Be a Butterfly'; 'The Soldier's Tear'; 'We Met—'twas in a Crowd'; and 'She Wore a Wreath of Roses.' His best play is 'Perfection'; among his novels are 'The Aylmers'; and 'A Legend of Killarney.' 'Loves of the Butterflies'; and 'Songs of the Old Château,' are volumes of songs and ballads; and his other works include 'Kindness in Women,' a collection of tales; 'Parliamentary Letters and other Poems,' and 'Rough Sketches of Bath.'

Bayly, Thomas Henry, American statesman. b. Accomac County, Va, 1810; d. 22 June 1856. He was admitted to the bar in 1830, and was for several years a member of the General Assembly of his State. In 1842 he was elected judge of the circuit superior court of law, an office which he resigned in 1844, when elected a representative in the national Congress; and by successive re-elections he held the latter position till his death. As chairman of the Committee on Ways and Means, he was the leader of the house during many sessions, and was highly respected by men of all parties, as well for his urbanity and dignity, as for his ability. The family home in which he died was established by his ancestors from England in 1666, and it is remarkable that he held just the same public offices that had been filled by his father.

Baynam, William, American surgeon: b. Caroline County, Va., 1749; d. 8 Dec. 1814. He completed his medical education in London, where he resided for 16 years, and was long assistant demonstrator to the professor of anatomy and surgery in St. Thomas' Hospital. He was probably unsurpassed in his time as an anatomist, and performed many remarkable operations. He furnished some excellent preparations in the museum of Cline and Cooper in London, and wrote various papers for medical journals.

Bayne, Peter, Scottish writer: b. Fodderty, Scotland, 19 Oct. 1830; d. London, 10 Feb. 1896. He studied theology at Edinburgh and philosophy under Sir William Hamilton, and was editor successively of the Glasgow *Commonwealth*; Edinburgh *Witness*; London *Dial*; and *Weekly Review*; and associate editor of the *Christian World*. He was author of 'The Christian Life: Social and Individual' (1855); 'Essays Biographical, Critical, etc.' (1859); 'Life and Letters of Hugh Miller' (1871); 'Testimony of Christ to Christianity' (1862); 'The Days of Jezebel,' a drama (1872); 'The Chief Actors in the Puritan Revolution' (1878); 'Life of Martin Luther' (1887).

Baynes, Thomas Spencer, English philosopher: b. Wellington, Somersetshire, March 1823; d. 29 May 1887. He was educated at Bath, Bristol College, and the University of Edinburgh, where he became (1851-5) assistant to Sir William Hamilton, then professor of logic.

BAYOMBONG — BAYRHOFER

In 1857 he was appointed examiner in logic and mental philosophy in the University of London; became (1857-64) assistant editor of the *Daily News*, to which he contributed many noteworthy articles on the American Civil War, and at this time wrote for several literary journals, such as the 'Athenæum' and the 'Literary Gazette.' In 1864 he was elected professor of logic, rhetoric, and metaphysics in the University of St. Andrews. Besides his contributions to reviews he published a translation of the 'Port Royal Logic,' with notes (1851); and an 'Essay on the New Analytic of Logical Forms' (1852). He was appointed editor of the ninth edition of the 'Encyclopædia Britannica' (being subsequently assisted by Prof. Robertson Smith).

Bayombong, bā-yōm-bōng', Philippines, the capital of the province of Nueva Vizcaya, Luzon, situated on the Magat River. It is the centre of a fertile rice and tobacco region. Pop. 3,691.

Bayonet, a straight, sharp-pointed weapon, generally triangular, intended to be fixed upon the muzzle of a rifle or musket, which is thus transformed into a thrusting weapon. It was probably invented about 1640, in Bayonne, though this is doubtful, but was not universally introduced until after the pike was wholly laid aside, in the beginning of the 18th century. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted as formerly in the inside. A variety of the bayonet, called the sword bayonet, is now quite widely used, especially for the short rifles of the light infantry, the carbines of the artillery, etc. It is a compound of the sword and the bayonet, as its name indicates, having a sword-like blade with only one edge, and being capable of being fastened to the muzzle of the gun like the bayonet. The battle of Spire, in 1703, was the first in which charges of infantry were made with fixed bayonets. Opinions as to the present utility of bayonets differ widely, many authorities considering them of little importance, while others assert just the contrary. While the result of a battle is often determined by the employment of smokeless powder and long-range and rapid-firing rifles in surprises and night attacks the bayonet may be used to advantage as was frequently proved in the Boer war (1889-1902). See also TACTICS.

Bayonne, bā-yōn, a cathedral town in the department of the Basses-Pyrénées, France. It is situated at the confluence of the Nive and the Adour, about four miles from the Bay of Biscay. These rivers form a harbor capable of admitting vessels of considerable size. They divide the town into three parts, namely, Great Bayonne on the left bank of the Nive, Little Bayonne between the rivers, and St Esprit on the right bank of the Adour. A citadel, built by Vauban, on the summit of an eminence in the suburb, commands the harbor and the city. The cathedral is a beautiful building dating from 1213, restored in the 19th century and furnished with two towers. The arsenal, one of the finest in France, and the mint are among the other buildings of Bayonne. The city has a considerable trade with Spain, Portugal, and South America, and masts and other timber for ship-building, from the Pyrenees, are exported

to Brest and other ports of France. The hams of Bayonne are famous. Ships are built, and woolens, chocolate, soap, etc., are manufactured. Among the lower class the ancient Biscayan or Basque language is spoken. Catherine de Medici had an important interview with the Duke of Alva in Bayonne, June 1565, at which it is said the massacre of St. Bartholomew was arranged. The meeting of Napoleon with the king of Spain, Charles IV., and the prince of the Asturias, took place here in May 1808, when the latter transferred their rights to the Spanish territories in Europe and India to the French emperor. Pop. (1896) 22,278.

Bayonne, bā-yōn', N. J., a city in Hudson County on New York harbor, the Kill von Kull, and Newark Bay, and the Central R.R. of N. J.; seven miles southwest of New York. It was formed by the union of a number of former villages (Pamrapo, Bayonne, Centerville, and Bergen Point), and is principally engaged in coal-shipping and the exporting and refining of petroleum, the works for the latter being connected by pipe lines with New York, Philadelphia, Baltimore, and other cities. Other industries are the manufacture of chemicals, ammonia and colors. The residential part of the city is very attractive, containing fine homes of New York business men. Its public library contains 11,000 volumes. Pop. (1900) 32,722.

Bayonne Conference, a conference held at Bayonne, June 1565, between Charles IX. of France, the queen mother, Catherine de Medici, Elizabeth, queen of Spain, and the Duke of Alva, envoy of Philip II., to arrange plans for the repression of the Huguenots.

Bayonne Decree. On 17 April, 1808, Napoleon directed the capture and sale of all vessels entering the ports of Spain, France, Italy, and the Hanse towns, under the American flag, and by the provisions of this declaration, known as the Bayonne Decree, France is supposed to have confiscated more than 300 American vessels. The decree was issued ostensibly with the view of helping the United States to enforce the embargo of 1807 and on the presumption that all such vessels must be sailing under false colors and thus indirectly benefiting the English cause.

Bayonne, Treaty of, a treaty of peace agreed to 4 May 1808, and signed on the next day, between Napoleon I. and Charles IV., king of Spain. The latter resigned his kingdom, and Napoleon I. engaged to maintain its integrity, and to preserve the Roman Catholic religion. His son, Ferdinand VII., confirmed the cession 10 May.

Bayou, bī'oo, probably a corruption of the French word *boyau*, a "gut" or "channel." Its strict signification is a stream which is not fed by springs, but flows from some other stream or from a lake; but it is not unfrequently used in America as synonymous with "creek." The term is very little employed except in the States of Louisiana, Texas, and Arkansas.

Bayou State, the name often given to the State of Mississippi.

Bayreuth, bī'roit. See BAIREUTH.

Bayrholder, bī'r'hōf-fēr, Karl Theodor, German Hegelian philosopher and radical politician: b. Marburg, 1812; d. Jordan, Wis., 3 Feb. 1888. He was professor of philosophy at Marburg,

taking the chair in 1845, but in 1846 his radical views caused his expulsion. During the brief rule of liberalism in Hesse, he was chosen president of the chamber; but, in 1853, was forced to flee to the United States. Among other works he wrote 'On Catholicism in Germany'; 'Idea and History of Philosophy'; 'Fundamental Problems of Metaphysics,' etc.

Baza, bā'tha (ancient BASTI), a city of Spain, in the province of and 53 miles east-northeast from Granada, in a valley north of the Sierra Baza. The environs yield wine and hemp; sheep, cattle, and mules are reared; and there are some manufactures. Baza is famed in early Spanish history, more especially in that of Granada. In 1489 it was taken from the Moors by the Spaniards, after a siege of nearly seven months. In 1810 the French, under Marshal Soult, here defeated the Spaniards under Generals Blake and Freire. Pop. (1897) 11,992.

Bazaine, ba-zān, **François Achille**, French military officer: b Versailles, 13 Feb. 1811; d. 28 Sept. 1888. He entered the army in 1831, served in Algeria, in Spain against the Carlists, and in the Crimean war. He joined the Mexican expedition under Gen. Forey, was present at the siege of Puebla, and shortly afterward was the first to enter the city of Mexico. In 1863 he obtained the chief command, was made a marshal of France in 1864, and remained in Mexico with the Emperor Maximilian. When Napoleon III. abandoned the emperor, Bazaine tried vainly to persuade him to abdicate the throne voluntarily. In 1870, at the outbreak of the Franco-Prussian war, he commanded the 3d army corps, and capitulated at Metz, after a seven weeks' siege, with an army of 170,000 men. For this act he was tried by court-martial in 1871, found guilty of treason and condemned to death. This sentence was commuted to 20 years' seclusion in the Isle of St. Marguerite, off the south coast of France, from which he escaped and retired to Spain. His widow, who had clung faithfully to him in his adversity and had plotted successfully for his escape, died in the city of Mexico, 8 Jan. 1900. She was a woman of aristocratic birth and much beauty. See La Brugère, 'L'affaire Bazaine' (1874); L'Hérisson, 'La légende de Metz' (1888).

Bazalgette, bāz-āl-jet', **Sir Joseph William**, English civil engineer: b Enfield, England, 1819; d. London, 1 March 1891. As chief engineer of the London board of works he built many miles of sewers and embankments, three of the Thames bridges, and the well-known Thames embankments. He was an expert authority on questions of municipal engineering.

Bazan, ba-zān, **Don Cæsar de**. See DON CÆSAR DE BAZAN.

Bazan, ba-thān', **Emilia Pardo**. See PARDO BAZAN, EMILIA.

Bazancourt, bā-zān-koor, **Ce'sar** (BARON DE), French military historian: b Paris, 1810; d. there, 25 Jan. 1865. He was official historiographer to Napoleon III., whom he accompanied in several campaigns. He published 'L'expédition de Crimée jusqu'à la prise de Sebastopol' (1856); 'La campagne d'Italie de 1859'; 'Les expéditions de Chine et Cochinchine' (1861-2); 'Histoire de Sicile sous la domination des Normands' (1846); and the novels:

'Georges la Montagnard' (1851); 'Noblesse Oblige' (1851); 'La Princess Pallianci' (1852).

Bazancourt, **Jean Baptiste Marin Antoine Lecat de**, French general: b. Val-de-Molle (Oise), 19 March 1767; d. 17 Jan. 1830. He took an active part in the Italian campaigns; distinguished himself and was wounded at the siege of St. Jean d'Acre; fought in the battle of Austerlitz, and was a member of the court-martial which, on 21 March 1804, pronounced the sentence of death upon the Duke d'Enghien. In 1806 he was appointed commander of the legion of honor, and in 1808 promoted to the rank of brigadier-general, while in the same year he was created baron of the empire, and went as commander to Hamburg with a mission connected with the continental blockade. He withdrew from service in 1815.

Bazar, or **Bazaar**, a market-place in the East, the word being Arabic in origin. Some bazars are open, some covered over. As the Orientals live almost entirely out of doors, the bazars of populous cities, besides their mercantile importance, are of consequence as places of social intercourse. In the Oriental tales,—for instance, in the 'Arabian Nights,'—the bazars occupy a very conspicuous place. The word bazar has also been imported into Europe, where it is used in much the same sense as in the East. Among English-speaking people it is frequently applied to a temporary sale of fancy goods contributed gratuitously, and sold to raise a special fund.

Bazard, ba-zar, **Saint Amand**, French socialist: b Paris, 1791; d. 29 July 1832. After the Restoration, he helped to found the Revolutionary Society of the 'Amis de la Vérité,' and in 1820 an association of French Carbonari. In 1825, impressed with the necessity of a total reconstruction of society, he attached himself to the school of Saint-Simon, and became one of the editors of a journal termed 'Le Producteur.' In 1828 he delivered at Paris a series of lectures, the substance of which was published in the 'Exposition de la Doctrine de Saint-Simon' (1828-30), of which the first part was by Bazard, the second being chiefly the composition of Enfantin. He and Enfantin became the acknowledged leaders of the school. After the July Revolution (1830), a larger scope was afforded to the Saint-Simonians. The masses were attracted by the doctrine that all social institutions ought to have for their end the moral, intellectual, and physical amelioration of the poor. In a short time, Bazard and his friends had created a new society, living in the midst of the old, with peculiar laws, manners, and doctrines. But Bazard's connection with it was of short duration. He differed from Enfantin on the doctrine of the emancipation of women, and in 1831 seceded in disgust. His efforts to found a school of his own proved unsuccessful, and, during a heated discussion with his former friend, Enfantin, he was struck with apoplexy, from the effects of which he died.

Bazarjik, bā-zār-jēk', a town in eastern Bulgaria, situated north of Varna. An important fair is held here annually. It was twice captured by the Russians, in 1774 and 1810. Pop. (1888) 10,717.

Bazigars, bā-ze-gārz', a tribe of nomadic Indians dispersed throughout the whole of Hindustan. They are divided into seven castes;

BAZOCHE—BEACH

their chief occupation is that of jugglers, acrobats, and tumblers, in which both males and females are equally skilful. They present many features analogous to the gypsies of Europe.

Bazoché, *bā-zōsch*, or **Basoche** (a corruption of *Basilica*), a brotherhood formed by the clerks of the Parliament of Paris at the time it ceased to be the Grand Council of the French king. They had a king, chancellor, and other dignitaries; and certain privileges were granted them by Philip the Fair early in the 14th century, as also by subsequent monarchs. They had an annual festival, having as a principal feature dramatic performances in which satirical allusions were freely made to passing events. The representation of these farces or satires was frequently interdicted, but their development had a considerable effect on the dramatic literature of France. The order was suppressed 13 Feb. 1793.

Baztan, *baz-tan'*, or **Bastan**, a Pyrenean valley in the extreme north of Spain; having a length of nine miles, and an average breadth of four miles. It is inhabited by about 8,000 people, who form, under Spanish supervision, a diminutive republic, at the head of which is the mayor of Elizondo. The citizens of this republic rank with the Spanish nobility and hold special privileges, which were granted them for former services to the Spanish crown.

Bdellium, *dēl'li-ūm*, an aromatic gum found in different countries, but brought chiefly from Arabia and India. It resembles myrrh in its appearance, and is hence often fraudulently substituted for it. It is obtained from *Balsamodendron mokul* and *B. roxburgu*. It has a sweet smell but bitter taste, softens readily between the fingers before the fire, and dissolves partially in alcohol and still more in water. A better variety of bdellium is that produced by the west African *B. africanum*; it is used in plasters.

The bdellium mentioned in Scripture, in Hebrew *bedholachh*, is rendered in the Septuagint of Gen. ii. 12, anthrax (literally, "burning coal") = the carbuncle, ruby, and garnet (Liddell and Scott), the red sapphire (Dana); while in Num. xi. 7 it is translated *krystallos* = rock crystal. Some modern writers, following the Septuagint translation, make it a mineral, as are the gold and onyx stone with which it is associated in Gen. ii. 12, while the Rabbins Bochart and Gesenius consider that it was a pearl or pearls.

Beach, Alfred Ely: b. Springfield, Mass., 1 Sept. 1826; d. 1 Jan. 1896. He was a son of Moses Yale Beach, and after receiving an education in the Monson Academy at Monson, Mass., he was associated with his father in the publishing business of the *New York Sun*. In 1846 he formed a partnership with his life-long friend and schoolmate, Mr. Orson D. Munn, of Monson, Mass., and purchased the 'Scientific American' from Rufus Porter, combining with the business of publishing that of soliciting patents. In 1853 he invented the first typewriter which printed raised letters on a strip of paper, intended for the blind, and was awarded a gold medal at the Crystal Palace Exposition. In 1867 he constructed a suspended tube 8 feet in diameter by 100 feet long, through which passengers were carried back and forth in a tightly fitting car, as the air was exhausted from

or forced into the tube by a rotating fan. He also devised means for transporting letters through a tube under the street, by which they could be conveyed directly to the post-office when dropped into a street letter-box.

His most important invention,—a shield for tunneling under streets or rivers without disturbing the surface,—was made in 1868, and became known as the Beach shield. It resembled a gigantic hogshead with the heads removed, the front circular edge being sharp, and the rear end having a thin iron hood. This cylinder is propelled slowly forward through the earth by several hydraulic rams forced out from the rear of the shield, by the operation of a single hydraulic pump, against the completed tunnel in the rear. By this method only the amount of earth to be occupied by the tunnel is excavated. After the shield is forced forward the hydraulic rams are pushed back, and in the thin hood at the rear a new section of the tunnel is constructed. In 1869, by means of such a shield, Mr. Beach constructed a tunnel nine feet in diameter under Broadway, New York, from the corner of Warren Street south to a point opposite the lower side of Murray Street, and in 1870 a car was sent to and from tracks through this tunnel by pneumatic power—the first underground transit in New York. From 1872 to 1876 Mr. Beach edited an annual publication entitled "Science Record," published by the 'Scientific American.' In 1876 he originated the 'Scientific American Supplement,' devoted to the publication of scientific matters *in extenso*, taken largely from exchanges and foreign publications. He was also instrumental in beginning the publication of the 'Scientific American Builders' Monthly.'

Beach, Charles Fisk, American clergyman and lawyer. b. Hunter, N. Y., 5 Sept. 1827. He studied theology at Auburn Theological Seminary, N. Y., was pastor of Presbyterian churches 1854-73, editor and publisher *National Presbyterian* 1873-95, and was admitted to the bar 1896. He has published 'The Muzzled Ox' (1866); 'The Christian Worker' (1869); 'Commentaries on the Law of Trusts and Trustees' (1897); 'Monopolies and Industrial Trusts' (1898).

Beach, Charles Fisk, Jr., American legal writer: b. Kentucky, 4 Feb. 1854. He was called to the bar in New York 1881, and practised in that city till 1896, but since the last named date has practised in London and Paris. His especial field is railway and corporation law, and he has published treatises on 'Receivers' (1887); 'Wills' (1888); 'Railways' (1890); 'Private Corporations' (1891); 'Modern Equity Jurisprudence' (1892); 'Public Corporations' (1893); 'Modern Equity Practice' (1894); 'Injunctions' (1895); 'Insurance' (1895); 'Contracts' (1897); 'Contributory Negligence' (3d ed. 1899).

Beach, David Nelson, American clergyman. b. Orange, N. J., 30 Nov. 1848. Entering the Congregational ministry he was successively pastor of Congregational churches in Westerly, R. I., 1876-9; Wakefield, Mass., 1879-84; Cambridge, Mass., 1884-96; Minneapolis (1896-8), Denver from 1899. He was active in banishing the saloon from Cambridge and has been prominent in advocating a modified Norwegian liquor system in Massachusetts. He has

BEACH — BEACH-FLEA

written 'Plain Words on Our Lord's Work'; 'The Newer Religious Thinking'; 'How We Rose'; 'The Intent of Jesus.'

Beach, Frederick Converse, American editor: b. New York, 27 March 1848. In 1855 he removed to Stratford, Conn., where he received an education at public and private schools. In 1864, as a pastime, he began the practice of photography with his father, Alfred Ely Beach (q.v.), and has continued his interest in the art ever since. In 1866 he suggested to the commissioner of patents the utility and practicability of photo-lithographing the United States patents, a plan which was subsequently adopted. In 1868 he graduated from the Sheffield Scientific School of Yale University with the degree of Ph B. In 1869, after engaging in the business of patent solicitor at Washington, D. C., he returned to New York and was appointed assistant superintendent of the construction of the Beach pneumatic tunnel under Broadway, New York. (See BEACH, ALFRED ELY.) Subsequently he took up the manufacture of electrical instruments. In 1877 he entered the office of the 'Scientific American,' assisting his father, and after the latter's demise he became one of the editors.

He has made extensive experiments in photography and written much relating to the art. In 1884 he founded the Society of Amateur Photographers of New York, the name of which was afterward changed to the Camera Club of New York. In 1885 he assisted in organizing the American Lantern Slide Interchange. In 1889 he was instrumental in establishing a monthly magazine entitled 'The American Amateur Photographer.' In 1902 he was appointed editor-in-chief of the 'Encyclopedia Americana,' the policy of which it was determined should give full credit to all matters pertaining to America and Americans.

Beach, Mrs. H. H. A. (AMY MARCY CHENEY), American composer: b. Henniker, N. H., 5 Sept. 1867. She studied music from childhood, and made her first appearance in public as a pianist at the Boston Music Hall when 16 years old. She has composed a mass in E flat; 'The Rose of Avontown,' a cantata for female voices; a Gaelic symphony; a symphony, anthems, songs, and compositions for various musical instruments and full orchestras.

Beach, Harlan Page, American missionary: b. South Orange, N. J., 4 April 1854. He was graduated at Yale in 1878 and at Andover Theological Seminary in 1883. During 1878-80 he taught at Phillips Andover Academy; in 1883 he went to China as a missionary, remaining there seven years. Soon after his return he became head of the School for Christian Workers, Springfield, Mass., and in 1895, educational secretary of the Student Volunteer Movement for Foreign Missions. His publications include: 'Dawn on the Hills of Tang' (1898); 'Knights of the Labarum; or Four Typical Missionaries' (1898); 'New Testament Studies in Missions' (1899); 'Protestant Missions in South Africa' (1900); 'Geography and Atlas of Protestant Missions' (1902).

Beach, Miles, American jurist: b. 1840. He graduated at Union College, Schenectady, N. Y., studied law, and practised in Troy, N. Y. When 27 years of age he removed to New York and in 1879 was elected judge of the court

of common pleas, holding that office till 1894, when he passed to the bench of the supreme court of the State.

Beach, Moses Sperry, American inventor and editor: b. Springfield, Mass., 5 Oct. 1822; d. 25 July 1892. He was the son of Moses Yale Beach (q.v.), and in 1845 he married Chloe Buckingham, of Waterbury, Conn., and in the same year became joint proprietor, with George Roberts, of the Boston *Daily Times*. Soon after this he became associated with his father and brother in the publication of the New York *Sun*, and acquired the sole ownership of it in 1851, transferring it in 1868 to Charles A. Dana. It was while he was conducting the publication of the *Sun* that he invented and made several important improvements in printing-presses, which were patented, a few now being in use. Among them were the feeding of roll paper to the press instead of flat sheets, apparatus for wetting the paper prior to printing, and another improvement for cutting off sheets after printing; also a method of adapting newspaper presses to print both sides of the sheet at the same time, as is now customary. In 1867 he visited the Holy Land, on the steamer Quaker City, in company with the distinguished party of which "Mark Twain" was a member, and whose experiences formed the basis of Twain's book, 'The Innocents Abroad.' Mr. Beach brought back an olive-tree from the Mount of Olives, from which was made a pulpit stand that is at present in Plymouth Church, Brooklyn.

Beach, Moses Yale, American inventor and publisher: b. Wallingford, Conn., 15 Jan. 1800; d. 17 July 1868. He received a common-school education and before he was 21 married, and with a partner opened a cabinet factory at Northampton, Mass. In 1822 he established himself at Springfield, Mass., where he was very successful. He expended considerable money on a stern-wheel steamboat, the first to ply on the Connecticut River above Hartford. A powder engine intended for its propulsion proved ineffective. In 1829 he obtained an interest in a paper-mill and removed to Saugerties, N. Y., where his inventive faculty produced a rag-cutting machine, which he patented and which is still used in all paper-mills. In 1835 he purchased from his brother-in-law, Benjamin Day, the New York *Sun*, the first penny paper (then a comparatively new sheet), and to Mr. Beach was due the subsequent growth and popularity of that newspaper. In 1846 President Polk sent Mr. Beach on a secret mission to Mexico. In 1857 Mr. Beach retired from active business and settled in his native town, where he died.

Beach. See COAST; DUNE; OCEAN, LAKE; SHORE.

Beach-flea, one of a group of small amphipod Crustaceans (*Orchestia agilis*) which abound under sea wrack near high-water mark. When the dry weed is lifted they will be seen leaping like fleas, by means of the last three pairs of abdominal legs. They are brown, of the same color as the weed and wet sand beneath, about a quarter of an inch in length or about one half as large as the larger and more southern kind of beach-flea (*Talorchestia longicornis*), which is nearly an inch long. Consult: Arnold, 'Sea Beach at Low Tide.'

BEACH-GRASS—BEACONSFIELD

Beach-grass. See *AMMOPHILA*.

Beach-pea, a leguminous plant growing on beaches. See also *LATHYRUS*.

Beach Plants, the usually sparse vegetation of sea and lake shores above the water-line and below the cliffs or dunes, notable for its resemblance to the vegetation of deserts. The plants of sea beaches are closely similar to those of fresh-water shores, and not, as might be inferred, different on account of the salt content of the soil as an influencing factor. (See *HALOPHYTES*). Bordering the water is a strip of sand or gravel where, on account of summer wave action, land plants cannot gain a foothold, and where, because of exposure to sun and air, water plants are unable to live. Contiguous to this border is a zone of vegetation almost wholly restricted by winter wave action to annuals. Still farther back from the water is the region of perennials especially characterized by rosette plants and plants with underground storage organs. This region is safe from wave action at all times. Beach plants, like desert plants (see *XEROPHYTES*) are capable of withstanding more intense heat, cold, and light, and more violent winds than any other plants of ordinary climates. Other common terms for this vegetation are littoral, shore, and strand plants. See *DISTRIBUTION OF PLANTS*.

Beach-plum. See *PLUM*.

Beach-robin. See *BRANT-BIRD*.

Beaches, Raised, terraced, level stretches of land, consisting of sand and gravel, and lying at a considerable distance above and away from the sea, but bearing sufficient evidences of having been at one time sea beaches. They are quite common along the coasts of continents in the higher latitudes. In California such terraces occur as high as 1,500 feet above the present sea-level, while the coasts of Scotland are marked by a series of terraces succeeding each other at distances of from 10 to 25 feet. That the materials composing the beaches were deposited beneath the sea is proven by the marine character of the fossils which are often found in abundance. The existence of raised beaches is of importance to the geologist, as it affords direct evidence of changes of level between the sea and the land in comparatively recent times, and explains the widespread occurrence of sedimentary rocks over continental areas. Many large lakes are also fringed by terraces, but in this case they have resulted from a lowering of the water level and not from coastal movements. See also *LAKE*; *SHORE*; etc.

Beachy Head, England, a promontory on the coast of Sussex, about three miles southwest of Eastbourne; height 564 feet. Here a combined Dutch and English fleet, under Lord Torrington was defeated by a French fleet, under Tourville, in 1690. In 1828 a revolving light was erected here, 285 feet above the level of the sea, visible in clear weather from a distance of 28 miles.

Beacon, a conspicuous mark or signal either used to alarm the country in case of invasion, or as a guide to mariners. The alarm beacon was usually fire placed on the tops of high hills, the flames of which could be seen at a great distance by night, and the smoke by day. They were in great use for rousing the Border on an invasion either by Scotch or Eng-

lish. A beacon to mariners is either a landmark erected on an eminence near the shore, or a floating signal moored in shoal water.

Beacon Hill, one of the original three hills of the peninsula of Boston. It is north of Boston Common, and received its name from the fact that the public beacon was fixed upon its summit in the earliest colonial period. It has been much reduced in height, and the State House now occupies its highest position. Beacon Street extends in a westerly direction over the hill, skirting the Common and Public Garden. See *BOSTON*.

Beaconsfield, bēk'ōns-fēld or bē'kōns-fēld, **Benjamin Disraeli,** (EARL OF), English statesman. b. 21 Dec. 1804; d. 19 April 1881. He was the eldest son of Isaac D'Israeli (see *D'ISRAELI*, ISAAC), the well-known author of the 'Curiosities of Literature'; his mother also being of Jewish race. Little is known of his early education, though it is certain he never attended a public school or a university. In 1817 he was baptized into the Church of England. He was apprenticed to a firm of attorneys, but did not remain long in this uncongenial occupation. His father's position gained him an easy entrance into society, and before he was 20 he was a frequenter of such salons as those of Lady Blessington.

In 1826 he published 'Vivian Grey,' his first novel, a work which became very popular, and, considering the youth of its author, displays remarkable cleverness and knowledge of the world. He now traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterward reproduced in his books. In 1831 another novel, 'The Young Duke,' came from his pen. It was followed at short intervals by 'Contarini Fleming,' 'Alroy,' 'Henrietta Temple,' 'Venetia,' 'The Revolutionary Epic' (a poem), etc.

His father having acquired a residence near High Wycombe, Buckinghamshire, young Disraeli attempted to get elected for this borough in 1832. He came forward as a Radical or "people's" candidate as against the Whigs, and he was supported by the Tories, as well as by Hume and O'Connell, but was defeated. At the general election after the passing of the Reform Bill he again unsuccessfully contested High Wycombe, and the like ill-fortune attended him on another attempt in 1835, as also at Taunton the same year. On the latter occasion he appeared in the character of a decided Tory, and his change of political opinions naturally occasioned a good deal of comment. To this period belongs the noted passage of arms between him and O'Connell, which was signalized by a strength of language happily rare between public men in these days.

At last, however, he gained an entrance to the House of Commons, being elected for Maidstone in 1837. His first speech was treated with ridicule; he had to stop abruptly and sit down but he finished with the prophetic declaration that the time would come when the House would hear him. In 1839 he married the widow of his colleague in the representation of Maidstone, a lady 15 years older than himself. At the general election of 1841 he was sent to Parliament by Shrewsbury. He had now gained some reputation, and for some years he was an enthusiastic supporter of Sir Robert Peel. About this

time he became a leader of what was known as the "Young England" party, the most prominent characteristic of which was a sort of sentimental advocacy of feudalism. This spirit showed itself in his two novels of 'Coningsby; or, The New Generation,' and 'Sybil; or, The New Nation,' published respectively in 1844 and 1845.

For some years previous to the downfall of Sir Robert Peel in 1846 he was most persistent and bitter in his hostility to this statesman, whom he had so recently supported, being the advocate of protection against the free-trade policy of Sir Robert. His clever speeches of this period greatly increased his reputation, and by 1847 he was recognized as one of the leaders of the Tory party. Having acquired the manor of Hughenden in Buckinghamshire, he was in the above year elected for this county, and he retained his seat till raised to the peerage nearly 30 years later. In 1847 he published his novel of 'Tancred; or, The New Crusade,' a somewhat extravagant production containing enigmatic allusions to the great "Asian mystery."

His first appointment to office was in 1852, when he became chancellor of the exchequer under Lord Derby. The following year, however, the ministry was defeated, and Mr Disraeli again became leader of a Conservative Opposition. He remained out of office till 1858, when he again became chancellor of the exchequer with Lord Derby as his chief. As on the former occasion his tenure of office was but short; a reform bill which he had introduced causing the defeat of the government and their resignation after an appeal to the country. During the next six years, while the Palmerston government was in office, Mr. Disraeli led the opposition in the lower House with conspicuous ability and courage. He spoke vigorously against the Reform Bill brought forward in 1866 by the Russell-Gladstone ministry; but when, soon after, he came into power along with his chief, Lord Derby, the demand for reform was so urgent that he had to bring in a reform bill himself. Accordingly, in August 1867, a measure by which the parliamentary representation was reformed became law, being piloted through Parliament by Mr. Disraeli with remarkable tact and dexterity.

In February 1868 he reached the summit of his ambition, becoming premier on the resignation of Lord Derby, but being in a minority after the general election he had to give up office the following December. In 1874 he again became prime minister with a strong Conservative majority, and he remained in power for six years. This period was marked by his elevation to the peerage in 1876 as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern question and the conclusion of the Treaty of Berlin in 1878, when he visited the German capital. In the spring of 1880 Parliament was rather suddenly dissolved, and, the new Parliament showing an overwhelming Liberal majority, he resigned office, though he still retained the leadership of his party. Not long after this, the publication of a novel called 'Endymion' (his previous one, 'Lothair,' had been published 10 years before) showed that his intellect was still vigorous. His physical powers, however, were now giving way, and he died, after an illness of some weeks' duration. His wife had died in 1872 after having been created Viscountess Beaconsfield.

Among others of his writings, besides those already mentioned, are: 'A Vindication of the English Constitution' (1834); 'Alarcos, a Tragedy' (1839); and 'Lord George Bentinck, a Political Biography' (1852). Lord Beaconsfield was one of the most remarkable men of the 19th century. If not possessed of actual genius he was endowed with great intellectual power, and he had astonishing tenacity of purpose and showed remarkable tact and ability in managing men. As a parliamentary speaker and debater he had few rivals, and in wit, sarcasm, epigram, and other rhetorical devices he was a master. His novels are fatally open to criticism on many grounds, and it is doubtful if they will long maintain the place they at present hold. Their popularity has been largely owing to their author having so frequently introduced real persons into them under a more or less penetrable disguise, and presented them in a more or less favorable light.

Beaconsfield, Africa, a town of Cape Colony, in Griqualand West, formerly known as Du Toit's Pan. It lies a little to the east of Kimberley, with which it is connected by tramway, and is, like it, an upgrowth of the diamond fields. It is well supplied with churches, schools, and hotels. Pop. (1891) 10,478.

Beaconsfield, England, a market-town in Buckinghamshire, 24 miles west by north of London. It is situated on high ground, and its name is supposed to have originated from a beacon once set up there. The remains of Edmund Burke, who resided at Gregories in this parish, are deposited in the parish church; and the churchyard contains a monument in honor of the poet Waller, to whom the manor belonged, as it still does to his descendant.

Beadle. (1) An officer in an English university, whose chief business is to walk with a mace in a public procession. The universities of Oxford and Cambridge have each three esquire beaules (or bedels), one being attached to each of the faculties of law, medicine and arts, and divinity. The former university has also three yeomen beaules, and the latter one (2) An inferior parish officer, whose business is generally to execute the orders of the vestry, by whom he is appointed. These parochial beaules were originally officers given to the rural deans to cite the clergy and church-officers to visitations, and for other purposes.

Beads, small perforated ornaments, generally of a round shape and made of glass, but also of gold, silver, and other metals, paste, coral, gems, etc. The use of them as ornaments belongs to very early times, and this use, still continued, has made them an important article of trade with savage tribes. Glass beads are supposed to have been manufactured by the Phenicians more than 3,000 years before Christ. Beads have been found in the ruins of Assyrian temples, also as decorations of Egyptian mummies, and in the graves of the ancient Greeks, Romans, and Britons. The manufacture of glass beads was introduced into modern Europe by the Italians, and in the neighborhood of Venice it is still an important branch of industry. On the island of Murano alone several thousand workmen are employed in this manufacture. Birmingham is the chief seat of the manufacture of beads in Great Britain. For their use in religion, see ROSARY.

BEADS — BEALE

Beads, St. Cuthbert's. See ENCRINITES.

Beagle, a small hunting dog; in general appearance a diminutive fox hound, solidly built, well set upon straight fore legs, with plenty of bone in proportion to its size, good hard feet, and a broad, deep chest with ample lung capacity. It is of good disposition, and clever and industrious in the field. In color and marking it much resembles the fox hound, black, white, and tan being the more common colors, and these in more or less solid or pied masses. In its original home, Great Britain, there are both rough and smooth varieties, but the typical American beagle is smooth-haired. Beagles vary in height from 12 to 15 inches, and while excellent trackers are not so fast but that they can be followed on foot, a very common sport in Great Britain. Their voices are exceedingly musical and justify the name sometimes given them of "buglers." They are principally used for rabbit-hunting. In former times a very diminutive breed was in favor; according to one authority, no larger than well-grown kittens—so small, in fact, that it is said a whole pack could be carried afield in a pair of panniers slung across a pony's back.

Beagle, The, a small ship of the British navy which in 1828-34 was employed, under the command of Capt. (afterward Admiral) Fitzroy, in making surveys of the coast of Patagonia and other South American shores and waters. The expedition had for its naturalist the famous Charles Darwin.

Beagle Island, an island discovered by Admiral Fitzroy during a voyage in H. M. S. Beagle (q.v.). The channel of the same name is on the south side of the island of Tierra del Fuego.

Beak, or **Bill**, the projecting jaws or snout of a bird or other animal, when prolonged into an instrument for seizing or penetrating objects, and formed of hard materials, as bone, or covered with a rigid envelope, as of horn or chitin. It is most characteristic of birds, where it is called "bill" or "neb," and forms the principal means for obtaining, as well as devouring food (except in most birds of prey), and where it takes on a great variety of shapes and characteristics adapted to special habits and purposes (See BIRDS.) A more or less similar prolongation of mouth-parts occurs in many other animals, however, and receives a similar name. Among mammals, the duckbill (q.v.) is a conspicuous example of a true mammal with the lips formed into a horny bill much like that of a duck, and similarly used. The turtles have horny, projecting, parrot-like jaws of the same sort; and a curious imitation of this occurs among cephalopod mollusks. The prolonged jaws of various fishes, as of gars ("billfish"), sturgeons, etc., receive the term (technically *rostrum*), and these are often bird-like, as in the case of the spoon-billed catfish (q.v.). The term is also borrowed by entomologists to describe the elongated mouth-parts of many insects, such as blood-sucking flies; juice-sucking plant-bugs, weevils, and other forms. The prolonged tubular or trough-like parts (canals) of many gastropod shells protecting the siphon, and the prominent umbos of such bivalve shells as the cockles, clams, and fresh-water mussels, are also termed "beaks."

Beal, bēl, George Lafayette, American military officer: b. Norway, Me., 21 May 1825; d. 11 Dec. 1896. When the Civil War broke out he was captain of the Norway light infantry, and with this company was mustered into the 1st Maine regiment for the three months' campaign. At the end of this service he was commissioned colonel of the 19th Maine infantry, which took part in the battles of Cedar Mountain and Antietam and covered the retreat of Gen. Banks from Winchester to Williamsport, Va. He was mustered out with his regiment in May 1863; volunteered again; was made colonel of the 29th Maine, and promoted to brigadier-general of volunteers 30 Nov. 1864, for his services in the Red River campaign. On 15 Jan. 1866 he was mustered out of service with the brevet of major-general of volunteers. In 1880-5 he was adjutant-general of Maine, and in 1888-94, State treasurer.

Beal, Samuel, English Orientalist. He was educated at Trinity College, Cambridge, graduating therefrom in 1847. Some time after, he entered the royal navy as chaplain, and in that capacity saw active service in China and Japan. He made a close study of the Chinese and Japanese languages, and on his retirement from the navy in 1877 was elected professor of Chinese at University College, London. His principal work was tracing the early history of Buddhism in original Chinese records, and the results of his work were given to the world in several volumes, notably: 'The Catena of Buddhist Scriptures' (1872); 'The Legend of Buddha' (1876); 'Buddhist Records of the Western World' (1884); 'Life of Hienensiang' (1888); etc. He also catalogued a large series of Japanese Buddhist works.

Beal, William James, American botanist: b. Adrian, Mich., 11 March 1833. He graduated at the University of Michigan in 1859; taught in various institutions 1859-70, since which time he has been professor of botany in the Michigan Agricultural College. He is a Fellow of the American Society for the Advancement of Science, and was president of the natural history section of this society in 1883; first president of the Association of Botanists of the United States Experimental Stations in 1888, etc. His works include 'Grasses of North America' (2 vols.); 'The New Botany'; 'Plant Dispersal'; etc.

Beale, Dorothea, English teacher: b. London, 1831. She became mathematical tutor in Queen's College in 1850, and later, Latin tutor in the school; head teacher in the Clergy School, in Casterton, in 1857; and principal of Cheltenham Ladies' College in 1858. Her publications include 'Text-Book of English and General History'; 'Chronological Maps'; 'Report on Girls' Education Commission of 1864'; 'Work and Play in Girls' Schools.' In 1880 she became editor of the 'Ladies' College Magazine.'

Beale, Edward Fitzgerald, American diplomatist: b. Washington, D. C., 4 Feb. 1822; d. 22 April 1893; graduated at the United States Naval Academy 1842, and at the beginning of the Mexican war was assigned to duty in California under Commodore Stockton. After the war he resigned his naval commission and was appointed superintendent of Indian affairs for California and New Mexico. He was commissioned brigadier-general in the army by Presi-

dent Pierce. He served in the Union army in the Civil War, and at its close engaged in stock-raising in Los Angeles, Cal., till 1876, when President Grant appointed him United States minister to Austria.

Beale, Lionel Smith, English physician and biologist: b. London, 5 Feb. 1828, being the son of Lionel John Beale, M.R.C.S. He was educated at King's College School and King's College, London, of which he is an honorary Fellow. In 1852 he established a laboratory for chemical and microscopical studies, and in the following year became professor of physiology and general and morbid anatomy in King's College, London. In the same college he held in succession the professorships of pathology and of the principles and practice of medicine, but in 1896 he retired from the latter post. He is a Fellow of the Royal Society, and for some years has acted as treasurer of the Royal Microscopical Society. His published works are numerous, and deal with medical, anatomical, physiological, and biological subjects, the microscope, etc. Among the most important are 'How to Work with the Microscope'; 'Protoplasm; or, Life, Matter, and Mind'; 'Life and Vital Action in Health and Disease'; 'The Physiological Anatomy and Physiology of Man' (in collaboration with Dr. Todd and Sir W. Bowman); 'Disease Germs'; 'Life Theories and Religious Thought'; 'The Mystery of Life'; etc.

Beall, John Young, Confederate guerrilla: b. Virginia, 1 Jan. 1835; d. 24 Feb. 1865. He was appointed acting master in the Confederate naval service in 1863. On 19 Sept. 1864 he and a number of followers took passage on the Lake Erie steamer *Philo Parsons* and at a given signal took possession of the vessel, making prisoners of the crew. They also scuttled another boat, the *Island Queen*, and tried to wreck a railroad train near Buffalo, N. Y. In spite of a proclamation of Jefferson Davis assuming responsibility for this expedition, Beall was hanged on Governor's Island, N. Y., on the ground that, if acting under orders, he should have shown some badge of authority.

Beam, in architecture, a long, straight and strong piece of wood, iron, or steel, especially one holding an important place in some structure, and serving for support or consolidation; often equivalent to girder (q.v.). In a balance it is the part from the ends of which the scales are suspended. In a loom it is a cylindrical piece of wood on which weavers wind the warp before weaving; also the cylinder on which the cloth is rolled as it is woven. In ship-building, one of several strong transverse pieces of timber stretching across the ship from one side to the other, to support the decks and retain the sides at their proper distance, with which they are firmly connected by means of strong knees, and sometimes of standards. They are sustained at each end by thick stringers on the ship's side called shelf-pieces. The main-beam is next abaft the main-mast. The greatest beam of all is called the midship beam. A ship is said to be "on her beam-ends" when she lies entirely on her side, so that the beams are almost at right angles to the surface of the water. An object is said to be "a-beam" when it is in a line with the beams of the ship, and accordingly at right angles to its length.

Beam Engine. See STEAM ENGINE.

Beam-tree, White (*Pyrus aria*), a European and Asiatic tree of the natural order *Rosaceæ*, rarely exceeding 50 feet in height, often cultivated in dry and exposed situations for its ornamental leaves, which are bright dark-green above and light beneath; and for its large terminal corymbs of flowers which appear in late spring followed by showy orange-red or scarlet, acid and astringent fruits which resemble those of the service-berry (q.v.), and which are used to make a kind of beer. Its hard, fine-grained wood is made into cog-wheels. It is closely related to the mountain-ash (q.v.).

Bean, Nehemiah S., American inventor: b. Gilmanton, N. H., 1818; d. 20 July 1896. He learned the machinist's trade, and in the winter of 1857-8 built his first steam fire engine, which he named the *Lawrence*, and sold it to the city of Boston. In 1859 he took the management of the Amoskeag Locomotive Works in Manchester, where he had been employed in 1847-50. During 1859 he built the "Amoskeag Steam Fire Engine No. 1," the first of a class of engines which now is used everywhere.

Bean, Tarleton Hoffman, American ichthyologist: b. Bainbridge, Pa., 8 Oct. 1846. He graduated at Columbian University, Washington, D. C., 1876. He was editor of the 'Proceedings and Bulletins' of the United States National Museum, Washington, 1878-86, and of the 'Report and Bulletin of the United States Fish Commission,' Washington, 1889-92; was assistant in charge of the division of fish culture in the United States Fish Commission, 1892-5, and curator of the department of fishes in the United States National Museum, 1880-95. In 1893 he represented the United States Fish Commission at the World's Columbian Exposition, and in 1895 at the Atlanta Exposition. In 1895 he became director of the New York Aquarium, and in 1899 was appointed director of forestry and fisheries of the United States Commission to the Paris Exposition of 1900. His works include 'The Fishes of Pennsylvania'; 'The Salmon and Salmon Fisheries'; 'Oceanic Ichthyology' (with George Brown Goode); etc. He has also contributed articles to 'Forest and Stream.'

Bean (M. E. bene, ben; A. S. bean, a "bean"), a plant of the natural order *Legumino-seæ*, or legumes. Originally the smooth kidney-shaped, flat-sided seed of the broad bean, *Vicia faba*, it is now applied to various genera, usually with a specific epithet, as Lima bean, etc.

The broad bean (*Vicia faba*) is the bean of history. Its origin is doubtful, but it is probably a native of southwestern Asia and northern Africa. It is much grown in Europe, especially in England, but the hot dry summers prevent its cultivation in most parts of the United States. It is grown successfully in the maritime provinces of Canada, and in other parts, with corn and sunflowers, to make ensilage. It is an annual plant, growing from two to four feet high, erect, with thick angular stems; flowers usually white with black on the wings. The pods, which contain the thick flattened seeds, vary from two to four inches up to 18 inches long. The common varieties are the Broad Windsor and Mazayan; they are quite hardy and should be sown early. The soils best suited are heavy loams and clays. The green seeds are eaten as a vegetable, or, if allowed to mature, are ground

BEAN

and used as feed for horses and cattle. The straw is fed to cattle.

The kidney-bean of Europe is known in the United States as the bean *Phaseolus vulgaris*; it embraces all the common field, garden, snap, and string beans, both bush and climbing. The French know it as the haricot. It is probably a native of South America, and was introduced into Europe during the 16th century. Over 150 varieties are in cultivation; the growers usually group them into bush- and pole-beans. The bush-beans embrace the "field beans" grown for dry shelled seeds, also the green-podded and yellow-podded garden, string, or snap beans. The pole-beans are usually grown for use while green. Bush-beans do well on a good warm loam. The yellow-podded varieties and pole-beans require a richer soil. They should not be planted until danger from frost is over, and require constant cultivation while growing. Leading field varieties are white marrowfat, navy or pea bean, medium, and the kidneys: in string-beans, early Valentine, stringless green-pod, refugee, etc.: in yellow-podded beans, black wax, golden wax, kidney, and white: in pole-beans, Limas, large Lima, dreer Lima, etc. See Bulletins 87 and 115, Cornell Experiment Station. For forcing pole-beans under glass, see Bailey's 'Forcing Book'; Bulletin 62, New Hampshire Experiment Station, Durham.

The Lima bean (*P. lunatus*) is the most popular pole-bean. It is of South American origin, but is now grown in various parts of this country, most of the seed being raised in California. The short, flat, slightly kidney-shaped seeds are enveloped in flat, broad pods. The soy-bean (q.v.) (*Soja hispida* or *Glycine hispida*) is a bushy, erect, hairy plant which bears pea-like seeds in small pods. It is a native of China and Japan, where it is largely grown. It is used for forage and soiling. The cowpea (q.v.) (*Vigna catjang*) is generally used for forage, soiling, hay, and green manuring. The scarlet runner (*P. multiflorus*) is a perennial. It is grown largely for ornament, but in England the seeds and pods are eaten as a vegetable. The Adzuki bean (*P. radiatus*) is a native of Japan, and a recent introduction in America. (See Bulletin 32, Agricultural Experiment Station, Kansas). The frijole (*P. spp*) is grown in the southwestern States and in Mexico, where it is a staple food.

Other important Oriental beans, but not very common here, are: Mungo-beans (*P. mungo*); various species of Dolichos, as the asparagus-bean (*D. sesquipedalis*); and the locust or carob bean (*Ceratonia siliqua*), the pods of which are sold by confectioners as St. John's bread. The sweet pulp which surrounds the seed is eaten, especially in the Mediterranean. The pods and seeds are ground and used extensively as feed for cattle and other animals. The velvet-bean (*Mucuna utilis*) is often grown for ornament; also for forage and soil renovation in the southern States. It only ripens seed in the Gulf States and Florida. The beans and pods, when ground, are fed to cattle. The cooked green beans have caused illness in those who have eaten them. The sea-beans of the Florida coast are transported by ocean currents from the tropics. In 1899, 15,004 acres of green beans were grown, yielding 1,512,642 bushels, or an average of 100.8 bushels per acre. The four

leading States in bean cultivation are New York, New Jersey, Florida, and Virginia. These furnish about half the supply.

Uses and Feeding Values.—The seeds and sometimes the pods are used, either green or dry, as food for man and animals. Some species are grown for forage, hay, or green manuring. Owing to their nitrogen-gathering propensities they all aid in soil-renovation.

The average percentage composition of:

	Water	Protein	Nitrogen-free extract	Ether extract	Ash	Fuel value of one pound
Dry shelled beans...	12.6	22.5	29.6	1.8	3.5	1605 calories
Fresh shelled beans...	58.9	9.4	29.1	0.6	2.0	740
Fresh string beans...	89.2	2.3	7.4	0.3	0.8	195 "

With man, on an average, 90 per cent of the dry matter is digestible; 80 per cent of the protein; 96 per cent of the nitrogen-free extract; and 80 per cent of the ether extract. String-beans or green-shell beans are usually boiled and served in various ways. In composition they compare favorably with other vegetables. Dry beans are baked with salt pork or beef and used for soups and other dishes. They are a cheap, nutritious food, rich in starch and in the proteid, legumin; hence they may be used to replace meat in the diet. If the skins are removed they are easier of digestion and are not so liable to cause flatulence; the latter is due to the production of methane by fermentation in the intestines. Shell- and string-beans are preserved by evaporation or canning. String-beans are also preserved with salt. Cooked dry beans are canned. Bean flour consists of beans ground. Bean meal is used in Europe as feed for horses, cattle, and hogs. Bean cake is the residue after the oil has been extracted; it is fed to cattle in northern China. Bean curd is eaten by the natives of northern China.

Bean Diseases.—Pod-rust; anthracnose (*Colletotrichum lindemuthianum*), a fungus which attacks the stems, leaves, and fruit. The disease may be carried over in the seed, the affected ones may be recognized by the yellow or brown discoloration. A black discoloration with ensuing brittleness marks the progress of the disease on the leaves. The selection of sound seed, immediate removal of infected plants, and spraying with Bordeaux mixture, are recommended. The bean-rust (*Uromyces phaseoli*) appears as small brown, nearly circular, and slightly elevated dots on the leaves. These discharge a brown powder, the spores of the disease. Spraying with Bordeaux mixture is recommended. Blight (*Phytophthora phaseoli*) attacks the Lima bean. Spraying with copper compound is recommended. The bean-weevil (*Bruchus obtectus*) may injure the beans when stored. After harvesting, treat the seed two or three times, at intervals of three or four weeks, with carbon bisulphide.

Consult: De Candolle, 'Nativity of the Bean'; Gray and Trumbull, 'Origin of Cultivated Plants,' 'American Journal of Science' XXVI., 130; Sturtevant, 'American Naturalist,' (1887, p. 332; Wittmack, 'Ber. der Deutschen Bot. Gesellschaft,' VI. 374 (1888).

S. FRASER.

BEAN-GOOSE — BEARD

Bean-goose (*Anser segetum*), a species of European wild goose, distinguished from the true wild goose (*A. ferus*) by its comparatively small and short bill, which, as far as the nostril, is black, and above it of a reddish flesh color, whereas that of the gray lag, or true-wild goose, is orange-red, with a touch of grayish-white. They feed generally on high grounds, considerably inland, selecting particularly young wheat, stubbles sown down for grass, and, in spring, fields sown with beans, their fondness for which is supposed to have given them their name. They breed chiefly within the Arctic Circle, but their nests are often found in large numbers in the Hebrides. The bean-goose being rather less than the common wild goose, but having the same color, is sometimes provincially called the small gray goose.

Bean, St. Ignatius, a seed which yields strychnin. See ST. IGNATIUS BEAN.

Bean Weevil, a beetle, *Bruchus obtectus*, which is smaller than the pea-weevil, measuring .15 of an inch in length. Compared with that insect it is lighter and more uniform in color, being of a tawny gray, without the white spots so conspicuous in *B. pisi*. The uniform tawny gray elytra are spotted with a few oblong dark spots, situated between the striae; the antennae also differ in having the four basal joints more reddish than in *B. pisi*, while the terminal joint is red. The legs also are much redder. The eggs are laid on the outside of the bean; the young hatch and bore in, and there may be 8 or 10 grubs in a single bean. The chrysalis lies in a cavity in the bean just large enough to receive its body. The best remedy is to carefully examine the beans in the autumn and before sowing time, when the presence of the weevil can be easily detected by the transparent spots made by the larva. These should be burned and such beans as are apparently uninjured should be soaked for a minute in boiling-hot water, so that no beetles be overlooked.

Bear, or Bere, a species of barley (q.v.).

Bear Flag War, a rising against the Mexican government in 1846, by a small body of emigrants from the United States who had settled in California, thought to have been incited by Capt. John C. Fremont. He was then commanding a small detachment of American troops in California and a few Americans having proclaimed a republic in Sonoma and raised a flag on which was a figure of a bear, Frémont joined the insurgents with his troops. The Mexican war began in the following July and the Bear Flag war then became a part of the American scheme for the conquest of California.

Bear Lake, Great, a body of water in Canada, so named on account of its situation directly under the Arctic Circle, and therefore under the constellation Ursa Major. It is of very irregular shape, having five arms projecting out of the main body, and its greatest diameter is 150 miles. The principal supply of the lake is Dease River, which enters it from the northeast. Its outlet is on its southwestern extremity, at the bottom of Keith Bay, through Bear Lake River, which empties into Mackenzie River. The surface of Bear Lake is not more than 200 feet above the Arctic Ocean; conse-

quently, its bottom must, like many of the north-western lakes, lie considerably below the level of the sea. Great Bear Lake abounds in fish of many varieties, among which the herring-salmon is noted. The second land expedition, under Franklin, in 1825, wintered on the western shore of this lake, near its outlet, where they built Fort Franklin. Dr. Richardson, a member of the expedition, mentions a curious circumstance concerning the singing of birds of this lake, that when they first appeared after the long Arctic winter they serenaded their mates at midnight, and were silent during the day. The waters of the lake are so clear that a white substance can be distinctly discerned at the depth of 90 feet. This lake is situated about 250 miles east of the Rocky Mountains, about the same distance south of the Arctic Sea, and 400 miles northwest of Slave Lake. It is the basin of a water-shed of about 400 miles diameter.

Bear Mountain, the designation of a hill some 750 feet in height, situated in the north-eastern part of Dauphin County, Pa. In its vicinity are valuable deposits of anthracite coal.

Bear River, a river in Utah about 400 miles long, which rises in a spur of the Rocky Mountains, about 75 miles east of Great Salt Lake, takes first a northwesterly and then a southeasterly direction, forming nearly a letter V, of which more than half the entire length is in Oregon territory, and finally empties into the Great Salt Lake. Its valley is about 6,000 feet above the sea-level. At the bend of the river in Oregon, and about 45 miles from Lewis River, are found the famous Beer and Steamboat springs, which are highly impregnated with magnesia and other mineral substances.

Bear State, a popular nickname for Arkansas.

Bearberry, the name of the *Arctostaphylos*, a genus of plants belonging to the order *Ericaceæ* (heathworts). It includes the two species, *A. uva ursi* and *A. alpina*, both of which are American. They are sometimes ranked under the genus *Arbutus*. The flowers are rose-colored, the berry of the *Uva ursi* is red, while that of the other is black. The Manzanita of California is *A. manzanita* or *A. pungens*. It reaches a height of 30 feet, and forms dense thickets, impenetrable by man or cattle. By reason of an active glycoside, arbutin, bearberry is a very efficient urinary antiseptic, useful in cystitis, pyelitis, and urethritis. The arbutin is decomposed in the urine into hydroquinone and other bodies. Its antiseptic properties are due to the phenol hydroquinone. The extract of the plant is used for dyeing and tanning leather.

Beard, Charles, English Unitarian clergyman: b. Manchester, England, 27 July 1827; d. Liverpool, 9 April 1888. He was pastor of Renshaw Street Chapel, Liverpool, editor of the *Theological Review*, 1864-79, and author of 'Outlines of Christian Doctrine' (1859); 'The Soul's Way to God' (1875); 'The Hilbert Lectures,' his most important work and one much esteemed (1883); 'The Universal Christ' (1888); 'Martin Luther' (1889).

Beard, Daniel Carter, American artist and author: b. Cincinnati, Ohio, 21 June 1850. He first engaged in civil engineering and surveying; went to New York in 1878 and studied art, and

BEARD

has since become widely known as a book and magazine illustrator. He founded and became teacher of the department of animal drawing in the Woman's School of Applied Design, believed to be the first class of this character in the world. Besides his illustrative work he has published 'Moonlight'; 'Six Feet of Romance'; 'American Boys' Handy Book'; 'American Boys' Book of Sport,' etc.

Beard, George Miller, American physician and hygienic writer: b. Montville, Conn., 8 May 1839; d. New York, 23 Jan. 1883. He made a specialty of the study of stimulants and narcotics, hypnotism, spiritualism, etc. Among his works were: 'Our Home Physician' (1869); 'Eating and Drinking' (1871); 'Stimulants and Narcotics' (1871); 'American Nervousness' (1881); 'Sea-Sickness' (1882).

Beard, Henry, American painter: b. Ohio, 1841; d. New York, 19 Nov. 1889. He was a son of James Henry Beard, and nephew of William Holbrook Beard; served in the Union army during the Civil War; at its close applied himself to painting, particularly animal life; and, after his removal to New York, in 1877, was chiefly engaged in illustrating books and periodicals.

Beard, James Henry, American painter: b. Buffalo, N. Y., 1814; d. 4 April 1893. He became a portrait painter in Cincinnati, and painted the portraits of Henry Clay and other distinguished men. In 1846 he exhibited his 'Carolina Emigrants' at the National Academy in New York, of which he was elected an honorary member in 1848. In 1870 he removed to New York, and in 1872 was elected a full member of the National Academy. Subsequently he devoted himself to animal painting. Among his better known works are: 'Mutual Friend' (1875); 'Consultation' (1877); 'Blood Will Tell' (1877); 'Don Quixote and Sancho Panza' (1878); 'Heirs at Law' (1880); 'Which Has Pre-emption?' (1881); 'Detected Poacher' (1884); 'Don't You Come Here' and 'The Mississippi Flood' (1885); 'A Barnyard' and 'Li Yer Gimme Some? Say!' (1886).

Beard, Richard, American theologian: b. Sumner County, Tenn., 27 Nov. 1799; d. Lebanon, Tenn., 2 Dec. 1880. He was graduated from Cumberland College, Princeton, Ky., in 1832; was professor of languages there, 1832-8; president 1843-53. In 1854 he was called to the chair of systematic theology in Cumberland University, Lebanon, Tenn., a position held until his death. He was one of the ablest scholars and most conspicuous figures in the Cumberland Presbyterian Church. He published 'Why I Am a Cumberland Presbyterian' (1874); 'Systematic Theology,' a standard work regarded as the crystallization of the Cumberland Presbyterian form of thought and faith.

Beard, Thomas Francis, commonly known as FRANK BEARD, American artist: b. Cincinnati, 6 Feb. 1842. During the Civil War he served in the 7th Ohio regiment, and acted as a special artist for the Harper publications. As an artist he devotes himself especially to character sketches. From the age of 12 he has contributed pictures to the leading American magazines. As a lecturer he has had great success before Chautauqua and other audiences. He accompanies his talks by crayon sketches on a

blackboard. The title of his first lecture was "Chalk-Talk," whence the word originated. In 1881 he occupied the chair of aesthetics at Syracuse University. He has published: 'The Blackboard in the Sunday-school' (1880); and a number of short stories.

Beard, William Holbrook, American painter: b. Painesville, Ohio, 13 April 1825; d. New York, 20 Feb. 1900; brother of James H. Beard. He was a traveling portrait painter from 1846 till 1851, when he settled in Buffalo, N. Y. After several years of foreign study and travel he settled in New York in 1860. In 1862 he was elected a member of the National Academy. His works include genre and allegorical pictures, but he was most popular in painting animals, especially bears, whose actions he humanized in a satirical and pleasing manner. He made many studies of decorative architecture. Among his most popular works are: 'Power of Death' (1859); 'Bears on a Bender' (1862); 'Bear Dance' (1865); 'March of Silenus' (1866); 'Flaw in the Title' (1867); 'Darwin Expounding his Theories' and 'Runaway Match' (1876); 'Divorce Court' (1877); 'Bulls and Bears in Wall Street' (1879); 'Voices of the Night' (1880); 'Spreading the Alarm' (1881); 'In the Glen' (1882); 'Cattle Upon a Thousand Hills' (1883); 'Who's Afraid?' (1884); 'His Majesty Receives' and 'Office Seekers' (1886), etc. He published 'Humor in Animals,' a collection of his sketches (1885).

Beard, the hair on the chin, cheeks, and upper lip of men. It differs from the hair on the head by its greater hardness and its form. The beard begins to grow at the time of puberty. The connection between the beard and puberty is evident from this, among other circumstances, that it never grows in the case of eunuchs who have been such from childhood; but the castration of adults does not cause the loss of the beard. According to Cæsar, the Germans thought, and perhaps justly, the late growth of the beard favorable to the development of all the powers. But there are cases in which this circumstance is an indication of feebleness. It frequently takes place in men of tender constitution, whose pale color indicates little power. The beards of different nations afford an interesting study. Some have hardly any, others a great profusion. The latter generally consider it as a great ornament; the former pluck it out; as, for instance, the American Indians. The character of the beard differs with that of the individual, and, in the case of nations, varies with the climate, food, etc. Thus the beard is generally dark, dry, hard, and thin in irritable persons of full age; the same is the case with the inhabitants of hot and dry countries, as the Arabians, Ethiopians, East Indians, Italians, Spaniards. But persons of very mild disposition have a light-colored, thick, and slightly curling beard; the same is the case with inhabitants of cold and humid countries, as Holland, Britain, Sweden. The difference of circumstances causes all shades of variety. The nature of the nourishment likewise causes a great variety in the beard. Wholesome, nutritious, and digestible food makes the beard soft; but poor, dry, and indigestible food renders it hard and bristly.

BEARD MOSS — BEARDSTOWN

In general the beard has been considered with all nations as an ornament, and often as a mark of the sage and the priest. Moses forbade the Jews to shave their beards. With the ancient Germans the cutting off another's beard was a high offense: with the East Indians it is severely punished. Even now the beard is regarded as a mark of great dignity among many nations in the East, as the Turks. The custom of shaving is said to have come into use in modern times during the reigns of Louis XIII. and XIV. of France, both of whom ascended the throne without a beard. Courtiers and inhabitants of cities then began to shave, in order to look like the king, and, as France soon took the lead in all matters of fashion on the continent of Europe, shaving became general; but it was only from the beginning of the 18th century that shaving off the whole beard became common.

The English clergy by and by, probably in imitation of those of western Europe, began to shave the beard, and until the time of William the Norman, the whole of whose army shaved the beard, there prevailed a bearded class and a shaven class, in short, a laity and a clergy, in England. In forbidding the clergy to wear beards Gregory VII. (1084) appealed to the custom of antiquity. The higher classes indulged in the moustache, or the entire beard, from the reign of Edward III. down to the 17th century. The beard then gradually declined, and the court of Charles I. was the last in which even a small one was cherished. Shaving, among many ancient nations, was the mark of mourning; with others it was the contrary. Plutarch says that Alexander introduced shaving among the Greeks by ordering his soldiers to cut off their beards; but it appears that this custom had prevailed before among the Macedonians. The Romans began to shave about 296 B.C., when a certain Titinius Mena, a barber from Sicily, introduced this fashion. Scipio Africanus was the first who shaved every day. The day that a young man first shaved was celebrated, and the first hair cut off was sacrificed to a deity. Hadrian, in order to cover some large warts on his chin, renewed the fashion of long beards; but it did not last long. In mourning the Romans wore a long beard, sometimes for years. They used scissors, razors, tweezers, etc., to remove the beard. The public barbers' shops (*tonstrinae*), where the lower classes went, were much resorted to; rich people kept a shaver (*tonsor*) among their slaves. Army regulations generally prohibit the wearing of beards, while in the navy beards are permitted. Physicians suggest that the beard should be suffered to grow on the chin and throat where tendencies to throat diseases exist.

Beard Moss (*usnea barbata*), a lichen of gray color. See also *USNEA*.

Beardslee, Lester Anthony, American naval officer: b. Little Falls, N. Y., 1 Feb. 1838; d. near Augusta, Ga., 11 Nov. 1903. Appointed acting-midshipman 5 March 1850, he served in the East Indies in 1851-5, participating in one battle and several skirmishes with the Chinese army at Shanghai. Graduating from the Naval Academy 1856, he passed through all grades of the service to rear-admiral 1895, and was retired 1 Feb. 1898. During the

Civil War he commanded the monitor *Nan-tucket* in the attack of the ironclad fleet on the defenses of Charlestown Harbor, 7 April 1863, and captured the Confederate steamer *Florida* at Bahia, Brazil. In 1870 he took the steam-tug *Palos* to the East Indies, carrying on her the first United States flag through the Suez Canal. In 1879-80 he discovered, surveyed, and named Glacier Bay, Alaska. He is the author of a number of valuable official reports, especially those on 'The Strength of Metals,' 'Resources of Alaska,' and 'Present Condition of Affairs in Hawaii' (1897), published as Senate executive documents; 'The Strength of Wrought Iron and Chain Cables' (1880).

Beardsley, Aubrey, English author and illustrator: b. Brighton, 1874; d. Mentone, France, 16 March 1898. After receiving a grammar school education, he began working for London periodicals and publishers in 1892; and soon became widely known by his striking designs for posters and book covers. In 1894 he became art editor of 'The Yellow Book,' and while supplying it with illustrations, contributed drawings also to the 'Savoy' and 'Le Courier Française.' He illustrated 'Bons Mots' (1892); Malory's 'La Morte d'Arthur' (1893); Oscar Wilde's 'Salome' (1894); 'The Rape of the Lock' and 'An Album of Fifty Drawings' (1896); and wrote and illustrated 'The Story of Venus and Tannhauser' (1895); and a novel, 'Under the Hill' (1896).

Beardsley, Eben Edwards, American Episcopal clergyman and writer: b. Stepney, Conn., 1808; d. 22 Dec. 1891. He was for many years rector of St. Thomas's Church at New Haven. He wrote 'History of the Episcopal Church in Connecticut' (4th ed. 1883), and lives of 'Samuel Johnson, First President of King's College, New York' (1874); 'William Samuel Johnson, President of Columbia College' (1876); and 'Samuel Seabury, First Bishop of Connecticut' (1881).

Beardsley, Samuel, American jurist: b. Hoosic, N. Y., 9 Feb. 1790; d. Utica, N. Y., 6 May 1860. On leaving the common school he took up the study of medicine, but abandoned it for law. In 1813 he was a member of the militia that defended Sackett's Harbor. Two years later he was admitted to the bar, and became judge-advocate of the militia. In 1823 he was State senator from the Fifth District of New York. He was appointed attorney for the Northern District of New York by President Jackson, and was a member of Congress in 1831-6 and 1843-5. From 1836 to 1838 he was attorney-general of the State of New York. He became associate judge of the supreme court of New York in 1844, and three years later succeeded Judge Bronson as chief justice. On his retirement he devoted himself to the practice of his profession.

Beardstown, Ill., a city in Cass County, 45 miles northwest of Springfield, on the Illinois River. The St. Louis division of the Burlington Route has its repair and other shops at Beardstown. There are manufactures of flour, lumber, and window screens as well as important cooperage works. The city has a fine park and two great bridges across the river. It was settled in 1832 and received a city charter in 1896. Pop. (1900) 4,827.

BEARER COMPANY — BEARINGS

Bearing, in navigation and surveying, signifies the angle made by any given line with a north and south line. The bearing of an object is the direction of a line from the observer to that object.

In architecture, the space between the two fixed extremities of a piece of timber, or between one of the extremities and a post or wall placed so as to diminish the unsupported length. Also and commonly used for the distance or length which the ends of a piece of timber lie upon or are inserted into the walls or piers.

In mechanics, (a) The portion of an axle or shaft in contact with the collar or boxing (b) The portion of the support on which a gudgeon rests and revolves. (c) One of the pieces resting on the axle and supporting the framework of a carriage. (d) One of the chairs supporting the framework of a railway carriage or truck.

In heraldry, a charge; anything included within the escutcheon. Generally in the plural, as armorial bearings.)

Bearer Company, a British organization for removing wounded soldiers from the field of battle to the dressing station or temporary hospital, which is part of the equipment of the bearer company, and where first aid can be given to them. The bearer company, first introduced into the British army in 1873, comprises the medical and other officers for discipline and supply duties, over 30 non-commissioned officers and men, trained as sick bearers of the medical staff corps, about 100 attendant untrained bearers from the Militia Reserve, six "bätmen" and drivers of the Army Service Corps. Tents for the personnel and for the dressing stations are carried, and a bearer company also has ambulances, surgery wagons, equipment, supply, and water carts, requiring over 100 horses. A modified organization for mountain warfare comprises muleteers, mules, and a special kind of cacolets or litters. Half a bearer company is attached to each army corps on active service, forming the link between the battalion stretcher bearers and the field hospitals.

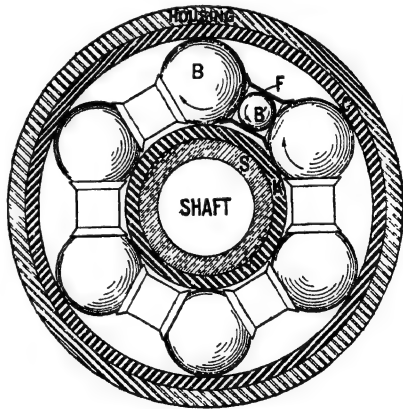
Bearings, Anti-friction. Anti-friction bearings are bearings involving the principle of rolling friction, as distinguished from sliding friction. An ordinary shaft turning in a plain journal slides around on a layer of some lubricating substance. If the lubricant is good and properly applied, little energy or power is lost in the heat produced by rubbing friction. If not, then much heat is produced, often to such an extent that the oil or grease is set on fire, dried up, thereby causing a so-called "hot box" or journal. The starting friction of a plain journal differs very greatly from the friction of motion. The reason is that while at rest under a heavy load, the film of the lubricant is penetrated, and contact of metal to metal is established. To overcome this contact, until the bearing has moved far enough to drag the film of oil between the points of contact again, requires much more power. Careful tests show the coefficient of rest to be from .09 to .13, as compared with .05 to .08 for the coefficient of motion. Bearings involving rolling friction are entirely different in this respect. No lubricant other than enough to prevent rusting is needed. Between the shaft and the wheel or other bearing is interposed some shape, made

of hardened metal that rolls between the two surfaces. Rollers and balls are the two forms adopted to accomplish this purpose. During the last decade rapid evolution has taken place in the design and range of use to which such bearings are applied. Improved manufacturing methods in the way of production of large balls are bringing this type rapidly to the front for large work, such as trolley and steam car bearings, shafting, and many other uses not formerly possible commercially, because of cost.

The latest improvements have also very greatly advanced the possibilities of the bearing of the ball type. It is the invention of C. H. Chapman, interposing smaller balls between the working, or load carrying balls, in such a way as to prevent all rubbing, sliding or wedging tendencies, thus eliminating all wear, and indefinitely prolonging the life of a bearing. Advanced designers of this bearing have learned also to skilfully combine the materials, dimensions and design of same in such a way as to successfully perform what has hitherto been thought too heavy work for ball or roller bearings. The saving of such a bearing as made by the American Compound Bearing Company over the plain journal is very remarkable. Tests give the following comparative results:

Bearing	Starting Friction	Running Friction
Plain	.100	.05
Ball	.009	.005

It is seen that the starting friction for this ball bearing is not appreciably greater than the running friction, and that under all conditions the running friction of this compound bearing (the highest refinement of anti-friction bearing), is less than one tenth of the friction of the best lubricated plain journal.



By referring to the cut it will be noted that *B* is the load-carrying ball, *B'* the idler, *F* the retaining tube or float for *B'*, *C* the cup, *K* the cone, and *S* the journal sleeve.

The idler *B'* is so placed that its centre is coincident with a line connecting the centres of each of the adjacent load-carrying balls *B*, and is positively and automatically held in position by a loose free tube *F* that floats with the load-carrying balls, but not in frictional contact with any of the balls when the same are under load, during which time the idler balls are maintained

BEARN — BEARS

in the same relative position by rolling contact with the load-carrying balls

An important and unique function of the compound features of the bearing is the differential compensating movement of the journal between the shaft and the balls, insuring a positive revolution of the load-carrying balls under all conditions.

For the class of journals that are called upon to start frequently, the saving in power is exceedingly great, and the necessity of saving power is bringing about the very general use of anti-friction bearings. Incidentally, there are other very important advantages in the decrease of annoyance and expense of lubrication, hot boxes and dirt attending the use of all plain journals. The use of anti-friction bearings as a means of saving power in all transmission problems is attracting increased attention among all mechanical engineers.

HENRY SOUTHER,

Engineer of the American Compound Bearing Company.

Béarn, *bā-ärn*, a former province of France, at the foot of the Pyrenees, with the title of a principality; about 42 miles long and 36 broad. It now forms part of the department of the Basses-Pyrénées. It belonged, with Navarre, to Henry IV., when he obtained the crown. The plain country is very fertile, and the mountains are covered with fir-trees, while within are mines of copper, lead, and iron; and the little hills are planted with vines, which yield good wine. Pau is the chief town. There is a peculiar and well-marked dialect,—the Béarnese,—spoken in this district, which has much more affinity with the Spanish than with the French. It contains a certain number of Greek elements, which some believe to have been derived from the ancient Greek colonists established in Gaul. The people have retained many Old-World manners, customs, and superstitions, as well as their old costume. See Bordenare, 'Histoire de Béarn et Navarre' (1873).

Bears, a family (*Ursidae*) of large, heavy, long-haired, plantigrade, carnivorous mammals, scattered throughout all the northern hemisphere, and some parts of the tropics. They are absent from Africa (except the Atlas Mountains, which zoologically belong to Europe), and from Australasia. In their structure and dentition they are allied to the dogs on one hand, and to the badgers, weasels, skunks, etc., (*Mustelidae*), on the other. The head is broad, and the jaws extended and rather narrow, but not so powerful as those of dogs or hyenas; while the teeth are complete and large, the molars especially being broad and tuberculous, fitting them well for crushing the vegetable fare so largely eaten by this group. The skeleton is massive, the limbs of great strength and furnished with long and powerful claws for digging, and for use in fighting. The whole sole of the foot rests upon the ground, leaving a footprint much resembling that of a man. Ordinarily they move about rather slowly and clumsily, yet all except the heaviest bears climb trees, and the largest scramble over rocks or ice with surprising agility; and all, when urged by rage or fear, can get over the ground at great speed, their gait being a lumbering but effective gallop. Their ears, though small, are highly developed, and their hearing is perhaps of more

service to them than is their eye-sight; but neither equals in keenness the nose, which seems to be extremely sensitive. In respect to food, bears are truly omnivorous, taking flesh, fish, or vegetable materials as circumstances favor. They seize such small animals of the woods as cannot avoid them, and near settlements raid the herds of swine and flocks of sheep and cattle, especially in search of the young ones. All bears eat fish, and some, like the Polar and the Kadiak bear, live almost wholly upon this diet, catching the fishes cleverly from the shore by a stroke of the paw, or going into the water after them. Reptiles, crabs, crayfish, etc., are eaten also; and insects form a large part of their fare, especially ants and honey-making bees and wasps. They dig up ant hills and overturn rotting logs and stumps for the former, and search out and tear to pieces the combs of the latter, well protected against stings by their long hair. They also eat succulent leaves and herbage, certain roots, fruit, and especially sweet acorns and berries, of which they are exceedingly fond. The Rocky Mountain Indians used to burn over certain tracts of mountain-side annually in order to keep the oaks low and promote the growth of certain berry-bearing bushes in order to attract the bears. They drink a great deal of water, enjoy going into it, and will swim long distances.

Bears are nowhere very numerous, each pair or family occupying a district and keeping it fairly well to itself. When, as frequently happens, three or four are seen together, they are likely to be old and young of the same family. Their home is usually some cave or crevice among rocks, a hollow tree, a tangle of wind-thrown logs, or a dense thicket. There, in the early spring, are born the young, usually two, sometimes four; and in the case of the Arctic species, this often happens under the snow, before the female is released from her hibernation. The young remain with the mother until fully grown; and when they are little she guards and controls them with great solicitude, and will rush at an intruder. At other times bears are rather shy and will usually endeavor to retreat, yet when brought to bay, fight with great courage, and are among the most dangerous animals men can encounter. Their attack is made with both teeth and claw, striking down or claspings the foe in a crushing embrace, and then tearing him with the teeth. They can easily be tamed, however, remain friendly and prove intelligent and docile to a limited extent. They submit well to confinement, endure change of climate, and breed readily in captivity. The close family likeness throughout the group has made their distinction into natural species a matter of much dispute and uncertainty. Everyone recognizes the great white "Polar" or "ice" bear of the Arctic region (*Ursus maritimus*) as distinct. Its elongated body, long, pointed head, slender limbs, large, hairy-soled feet, and cream-white coat, are quite unlike the features of any other. Large specimens are nine feet or more in length, and have enormous strength. These bears are numerous throughout the icy circumpolar regions, and wander a vast distance away from the coast on the ice, sometimes swimming many miles. They often winter and their young are born on the floes. They live mainly upon seals, young walrus, and fish, which they scoop out of the

BEARS

surf and from the coast rivers where they come to spawn, but in summer obtain various other kinds of food, including marine grass and shore herbage. The writings of Arctic explorers abound in accounts of this wide-spread species, and should be read by those who wish to know more of their habits. Another sub-Arctic bear that seems undoubtedly distinct is the glacier or "blue" bear of the Mount St. Elias Alps on the coast of Alaska (q.v.) first described by Dall in 1895, and named *Ursus emmonsii*. It is the smallest of all bears—not larger than a half-grown grizzly, and bluish black, with a dorsal stripe, the ears and the outer surfaces of the limbs jet black; black and silver is the prevalent color of the sides, neck, and rump; the belly and inside of the legs are white; sides of the nose bright tan color. Very little is known of its habits, or of the extent of its limited range.

The other American bears, called black, grizzly, cinnamon, Barren-Ground, brown, Kadiak, and so on, are so confusingly alike that some conservative naturalists regard them all as merely varieties of one species, altered by climate and food, and a tendency to individual variation; and it has even been said that there was no real specific distinction between them and the Old World bears, which also present differences that blend confusingly together when many specimens are compared. Others regard the differences not only of specific value, but even place some of the forms in separate genera. The latest monographer of the American *Ursidae* recognizes no less than eight species on this continent, besides the Polar bear, and the spectacled bear of the Andes (*Ursus ornatus*), which is thought by others to be merely an isolated variety of the black bear, that somehow has acquired whitish rings around its eyes. The black bear (*Ursus americanus*) is the most wide-spread of these, being found in all the forested regions of the continent north of Mexico, and still remaining wherever a large patch of forest, or a range of mountains or rough hills give it a harbor, whence it may raid the pasture-lots and pig sties of frontier farmers, especially in early spring, when wild food is scarce. Black bears climb trees easily, travel about a great deal, and are often captured and tamed. They are timid and secretive, and rarely are dangerous unless wounded or cornered and enraged. The color of this bear is properly black, but brown, reddish ("cinnamon"), or even yellowish examples are frequently seen. The nose is always tan-colored. In size they average about five feet, and never reach the dimensions of a large grizzly. The bears of Florida and of Texas are each regarded by some as separate species, but most naturalists consider them to be merely geographical races. The Barren-Ground bear (*Ursus richardsoni*) is a large whitish-brown species dwelling on the brushy plains northwest of Hudson Bay, which there is good reason to believe is an isolated American race of the European brown bear.

The grizzly bear (*Ursus horribilis*) of the mountains of western North America is one of the largest, and perhaps the most to be feared, of any of the family. It is found from the Black Hills and the Badlands of Dakota westward to the Pacific coast, and from Mexico to northern Alaska. A large specimen is nine feet

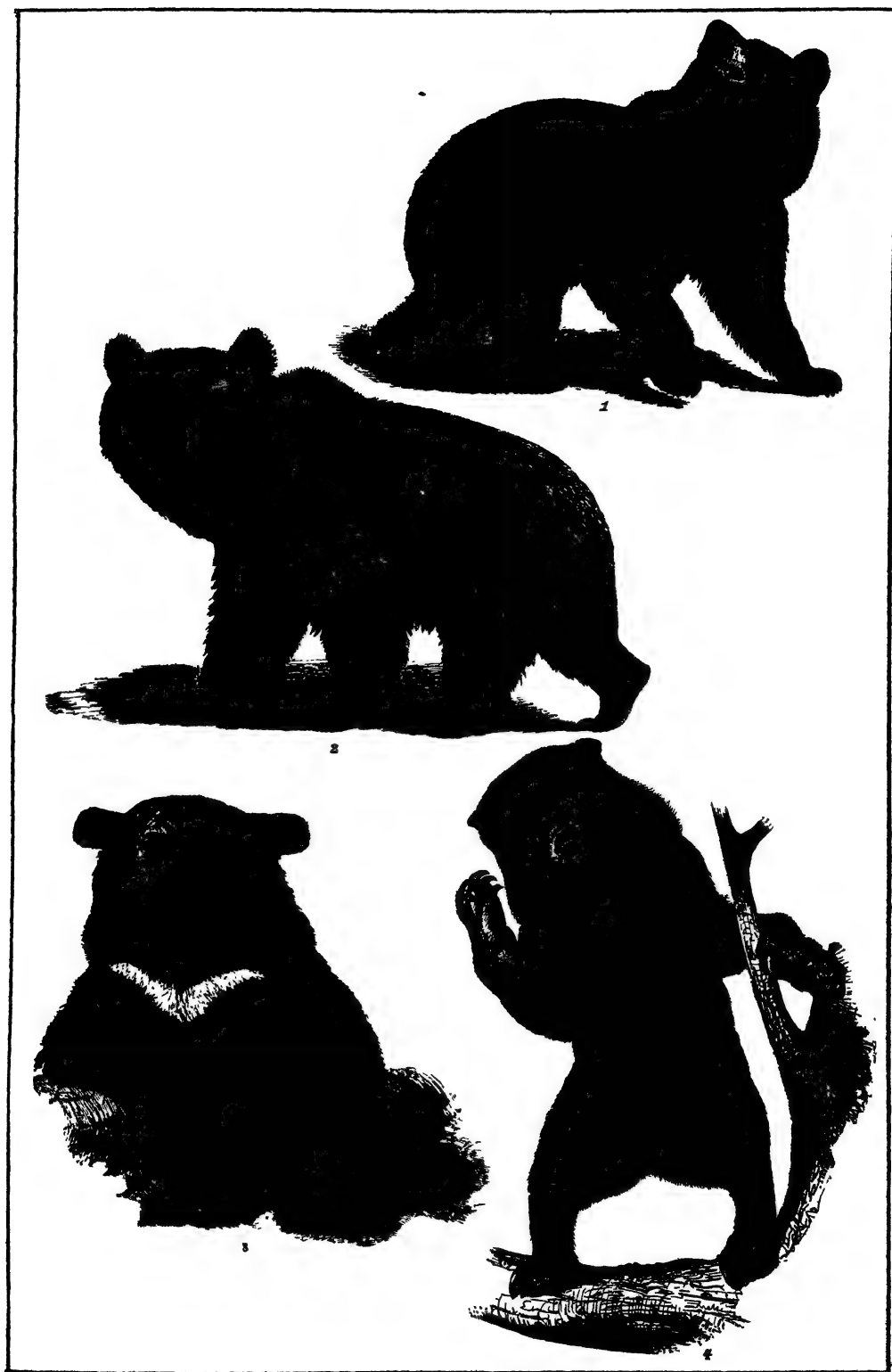
in length, and will weigh 1,000 pounds, but the size varies greatly. So does the color, which ranges from reddish-brown to hoary gray. Hence several varieties are recognized by hunters, such as "cinnamons," "silvertips" (in which the tips of the hairs are white), and "grizzlies." The typical form may be described as yellowish-brown, with a reddish mane, black dorsal stripe, and dark-colored legs. In form they are massive, with broad, squarish heads, and immensely muscular bodies. They cannot, or at any rate, do not, climb trees, but they scramble about the roughest mountains or through a dense forest with surprising agility, and can run very rapidly on occasions. They seem rarely if ever to hibernate, and go about alone or in pairs, eating all sorts of food, but seizing and pulling down large prey when an opportunity offers. In former days even a bull buffalo was unable always to resist their strength, and they constantly attacked them and the deer. At present the cattle and horses upon the ranges in some parts of the west suffer from their ravages. Though so mighty, and when at bay or enraged probably not less dangerous to encounter than a lion or tiger, they will usually avoid and flee from man, and do not seem quarrelsome, the tradition of a constant enmity between them and the black bears not finding support in facts. The grizzly is easily the most terrible of the game animals of North America, and one of the most formidable in the world; but different bears vary greatly in temperament and according to circumstances. The Indians and experienced hunters of the west, however, have learned to hold all of the race in the highest respect. Much the same statement will apply to the Barren-Ground bear, already mentioned, and to the Alaskan bears to be spoken of presently. The grizzly is still to be found throughout most of its range, though no longer numerous except in the wilder parts of the Rocky Mountains, in the northern parts of the Sierra Nevada, and in the high mountains northward from Oregon to Alaska, where the largest ones are now to be obtained. The Kadiak bear is a brownish species or variety (*Ursus middendorffi*) dwelling on Kadiak Island, Alaska, and the neighboring mainland. Specimens of it exceeding in size any other bear have been obtained, and weighing 1,200 pounds. Whether it will prove to be a distinct species remains to be seen. The same may be said of Dall's or the Sitka bear (*Ursus dalli*). Both are dark-brown or grizzled, and difficult to distinguish externally from other bears of the north.

The bears of the Old World have been divided into many species by earlier naturalists, but are now regarded as more nearly connected. The best known is the common brown bear of Europe and Asia (*Ursus arctos*). It is of large size, reaching about eight feet in length in the bigger European specimens, and is usually of some shade of yellowish-brown, reddish-brown, or black, but varies greatly. It is exceedingly difficult to distinguish from the American bears, and passes by indeterminate variation into the so-called species of Siberia, Japan, and the Himalayan region, the differences being such as might come from varying climate and habitat; thus those of the high Himalaya are smaller and lighter in color, etc. Although long ago extinct in Great Britain, it still lingers in the

BEARS.



BEARS.



1 American Black Bear (*Ursus Americanus*)

3 Black Bear of the Himalayan Mountains (*Ursus torquatus*)

wilder, more mountainous parts of Europe, and is numerous in the forests of Russia, the Caucasus, on the Lebanon range of Asia Minor (where it is called the Syrian bear), in the Atlas Mountains of Morocco, and throughout Asia north of the Himalayas. The largest are those of Kamchatka, where they are numerous and bold, and live in summer almost wholly on salmon, as do the Kadiak and other Alaskan bears east of Bering Sea. This is the bear most often seen in menageries, where it breeds readily; and which is led about by "bear-tamers," and taught certain clumsy "dancing" tricks. The Tibetan or "blue" bear (*Ursus pruinosus*), is a little known species regarded as distinct. Two other quite distinct species of bear belong to the Indo-Malayan region. One is the sloth-bear or honey-bear of India, a large animal which in its jungle home is one of the most dangerous carnivores of the Indian forests, yet is often tamed and led about the country by Hindu jugglers, who called it "aswail," etc. It is black, unusually shaggy, and has a prolonged mobile snout, a very long tongue and no teeth in the front of the mouth (after the milk teeth drop out), making its facial grimaces very comical. Another very distinctive feature is the large yellowish crescent on its breast. It is an agile climber, and exceedingly fond of robbing the nests of honey-making bees. These facts are recorded in its name (*Ursus* or *Melursus*), *labiatus*.

The Malayan sun bear, or "bruang" (*Ursus*, or *Helarctos*, *Maylayanus*), is a smaller species inhabiting the forests of the Malayan Peninsula, and islands eastward to Borneo. Its coat is short and fine, black in color, marked on the breast with a white or orange crescent, and the lips and tongue are remarkably long and flexible. It feeds mainly on ants, which it gathers with its glutinous tongue after digging up their hills, to which its long claws are well fitted.

Fossil bears, commonly called "cave bears," have been found in the Quaternary bone-breccia of many caves of Europe, North and South America. Some are closely allied to or identical with living species; others, as the California and South American cave bears, are referred to a distinct genus, *Arctotherium*. In the Tertiary strata of the Old World occur remains of a series of animals (*Amphicyon*, *Hyaenarctos*, etc.) which appear to connect the bears with primitive *Canidae*, indicating that they are an offshoot of the dog family. See also CAVE BEARS.

Bibliography—For structure and relationships of this group, consult: Flower and Lydekker, 'Mammals, Living and Extinct' (1891). For modern and contrasting ideas of classification: Lydekker, 'Proceedings of Zoological Society of London, for 1897,' page 412; Merriam, 'Proceedings Biological Society of Washington,' p. 65 (1896). For habits and hunting, such general works as Brehm, 'Thierleben'; the Standard, Royal, and Allen's 'Natural Histories'; Mayne Reid, 'Bruin, or the Grand Bear Hunt' (1864); Aflalo, 'Sport in Europe' (1901); the works of Jerdon, Blanford, and Blyth on the mammals of Persia, India, and eastward; and the writings of sportsmen-naturalists, especially Baker, Hornaday, Kinloch, Pollok, Sanderson, Shakespeare, and Wallace. For American bears, consult Richardson, 'Fauna Boreali Americana' (1829); Audubon and

Bachman, 'Quadrupeds of North America' (1846); Merriam, 'Mammals of the Adirondacks' (1882); Marey (editor), 'Sport with Rod and Gun' (1892); Shields (editor), 'Big Game of North America' (1890); Porter, 'Wild Beasts' (1897); and the writings of sportsmen in the Rocky Mountains, especially Baillie-Grohman, 'Fifteen Years of Sport, etc.' (1900).

Beas, bē'as, or **Bias** (the ancient *Hyphasis*), one of the five great rivers of the Punjab, having its rise at the Ratanki Pass, on the south side of the Sanch Mountain, a branch of the Himalaya system, in lat. 32° 21' N.; lon. 77° 22' E.; where the former attain an elevation of 13,300 feet. Its entire course is about 215 miles. The Beas has been considered larger than the Sutlej, which it joins, but it is greatly inferior to that river in the length of its course; and, though they have about the same breadth, the Sutlej has the greater volume of water. The united stream, below the point of junction, is called the Ghara or Gharra.

Beast Fables. See FOLK-LORE.

Beasts of Prey, is not a scientific term, but, as in the case of the phrase "birds of prey," represents merely the idea of an assemblage of such mammals as prey upon other creatures. The greatest number, and most prominent examples, belong to the order *Carnivora*, whose members subsist mainly upon flesh, and some of which, as the cats, bears, and wolves, are the most powerful, deadly, and dangerous animals of the world. These have acquired bodies with great strength and endurance in chasing and leaping, seizing and holding; teeth adapted to cutting and piercing; sharp muscular claws; and a high degree of intelligence in the wiles of hunting, and of courage and pertinacity in attacking their prey or defending their gains against rivals. Their digestive organs are simplified and adapted to the assimilation of flesh, of which a less quantity is required than in the case of an animal subsisting on vegetable fare, because it is already in a concentrated, partly elaborated form; but as the obtaining of it is occasional and often interrupted by long intervals, all beasts of prey are likely to kill and eat excessively when opportunity offers, in instinctive preparation for a possible fast. To provide against the loss of heat during the periods of famine, rather than as a provision against low temperature, most beasts of prey are clothed in dense, hairy coats of hair, or "fur." Not all the beasts of prey belong to the *Carnivora* for animals with similar structures and adaptations are to be found in other orders of mammals, whose basal structure is very different. The blood-sucking bats, for example, have teeth roughly similar to those of a dog; and some of the apes are savage and powerful and have carnassial teeth. The most precise parallel, however, is found in the predatory marsupials of Australia, such as the Zebra wolf, Tasmanian devil, and several others, which have the equipment and habits of true beasts of prey.

Beat, in music, the beating or pulsation resulting from the joint vibrations of two sounds of the same strength, and all but in unison. Also a short shake or transient grace-note struck immediately before the note it is intended to ornament. The Greeks employed the up beat

BEATIFIC VISION—BEATTIE

(*arsis*) to denote the accented, and the down beat (*thesis*) to signify the unaccented part of the measure, but in modern practice this is reversed.

Beatific Vision. See ESCHATOLOGY.

Beatifica'tion, in the Roman Catholic Church, an act by which the Pope declares a person beatified or blessed after his death. It is the first step to canonization, or the raising one to the honor and dignity of a saint. No person can be beatified till 50 years after his or her death. All certificates or attestations of virtues and miracles, the necessary qualifications for sainthood, are examined by the Congregation of Rites at Rome. This examination often continues for many years, and embraces a number of different steps or stages, at one of which a functionary known popularly as the "devil's advocate" brings forward all possible objections, and points out all weak points in the evidence brought forward in favor of the reputed saint. When the question has been finally debated in successive meetings of the congregation, the Pope at last gives his decision, and the beatification may then take place in the Vatican. Beatification differs from canonization in this, that "whereas the cultus of a canonized saint belongs to the universal Church, and churches and altars can be freely erected in his or her honor, and images, pictures, or statues of him or her displayed without special permission, in the case of one of the Blessed it is otherwise. The honor and veneration which are authorized in their regard are limited and partial; and because the cultus of one of them is permitted to one country, or city, or order, or branch of an order, it does not follow that it should be practised elsewhere; and the attempt to extend it without special permission is condemned." Compare Addis & Arnold's Catholic Dictionary. See CANONIZATION.

Beating the Bounds, a periodical survey or perambulation by which the boundaries of parishes in England are preserved. It is, or was, the custom that the clergyman of the parish, with the parochial officers and the boys of the parish school, should, on Ascension Day, march to the boundaries, which the boys struck with willow rods. A similar ceremony in Scotland is called riding the marches. In the New England colonies parallel duties were performed by "perambulators" and in Virginia by "processioners." The custom is of Teutonic origin.

Beatitude, the Christian term meaning the highest degree of happiness of which our nature is susceptible, and applied particularly to the state of the elect in heaven. It was a favorite topic of discussion among the scholastic theologians, who divided it into subjective and objective, perfect and imperfect, and made our eternal happiness consist in the vision of God perfecting the intellect and will in possessing Supreme Truth and God. Recent theologians have generally made beatitude consist in honoring God and sharing his perfections, a sublime though indefinite conception. Though the state of beatitude be incomprehensible to us, yet the belief in it is a motive in the present life which begets heroism in the midst of misfortune, and an adherence to virtue in the midst of evils. The Beatitude is the name given particularly to the beginning of the separate clauses in Christ's Sermon on the Mount.

Beaton, David, Scottish prelate and cardinal: b. 1494; d. St. Andrew's, 29 May 1546. He studied at St. Andrew's, Glasgow, and Paris, was for years Scottish resident in France, and in 1537 was consecrated bishop of Mirepoix in that country. Pope Paul III. raised him to the cardinalate in 1538, and next year he became primate of Scotland. He had much influence with James V., and after his death (1542) set himself to oppose the English party, to which the Reformers belonged. Upon the coronation of the young Queen Mary, he was made chancellor, and became also legate *a latere* from Rome. He now began to renew the persecution of heretics, and among the rest the famous Protestant preacher George Wishart suffered, being strangled and burnt at the stake, on the twofold charges of sedition and heresy. But a conspiracy had been formed against him, and he was assassinated at his own castle of St. Andrews. He was a man of great ability and recent historical research has cleared his character from many former calumnies.

Be'atrice, a witty, lively character in Shakespeare's 'Much Ado About Nothing,' who marries Benedick by the contrivance of the friends of each.

Beatrice Cenci, bā-a-trē'chā chēn'che, a 16th century Roman girl whose picture was painted by Guido Reni, and whose career is the subject of Shelley's tragedy 'The Cenci.'

Beatrice Portinari, bā-a-trē'chā pōr-te-nā're, the Beatrice of Dante's poems: b. about 1266; d. 1290. She was the daughter of a wealthy citizen of Florence, and wife of Simone de Bardi. She was but eight years of age, and Dante nine, when he met her first at the house of her father. He saw her only once or twice, and she probably knew little of him. The story of his love is recounted in the 'Vita Nuova,' which was mostly written after her death.

Be'atrice, Neb., a city and county-seat of Gage County, on the Big Blue River, and several railroads; 40 miles south of Lincoln, the State capital. It is the seat of the State Institution for Feeble Minded Youth; and has a handsome court-house, United States government building, Holly system of waterworks, electric light and street railway plants, public library, three national banks, excellent water power, flour and planing mills, tile and barbed wire works, creamery, iron foundry, and manufacturing of gasoline engines, wind mills, and farming implements. It was incorporated as a town, 1871, and as a city, 1873. Pop. (1900) 7,875.

Beatrice (be-ā'triks) **Antelope**, an Arabian oryx *Oryx beatrix*, resembling the beisa but without black markings on the haunches. See ORYX.

Beattie, bē'tī, **Francis Robert**, Canadian-American educator: b. near Guelph, Ontario, 1848. He was educated at Toronto University, studied theology at Knox College, Toronto, and at the Presbyterian College in Montreal. He was pastor at Baltimore and Cold Springs, Ontario, in 1878-82, and at Brantford in 1882-8. In 1888 he became professor of apologetics in the Presbyterian Theological Seminary in Columbia, S. C., where he remained till 1893, and then accepted the chair of systematic theology and apologetics in the Presbyterian Theological

BEATTIE — BEAUCLERK

Seminary, Louisville, Ky. His writings include 'An Examination of Utilitarianism' (1884); 'Methods of Theism' (1887); 'The Higher Criticism; or, Modern Critical Theories' (1888); 'Radical Criticism, an Exposition and Examination of the Radical Critical Theory of the Old Testament Scripture' (1895); 'Presbyterian Standards' (1896), etc.

Beattie, bā'te, James, Scotch poet: b. Kincardineshire, 25 Oct. 1735; d. Aberdeen, 18 Aug. 1803. He obtained a scholarship at Aberdeen, and subsequently became assistant in the Aberdeen grammar school, and married the daughter of the head schoolmaster. After this event he began to be distinguished as a writer, and in 1771 commenced the publication of his work called the 'Minstrel.' This obtained for him the patronage of Lord Errol, and caused him to be appointed professor of moral philosophy and logic in Marischal College. In 1765, he published a poem, the 'Judgment of Paris,' which failed of any celebrity. The work which gained him the greatest fame was an 'Essay on the Nature and Immutability of Truth,' in opposition to sophistry and skepticism. It was designed as a reply to Hume, and was so much in demand that in four years five large editions were sold; and it was translated into several languages. He was urged by the archbishop of York and the bishop of London to take orders in the Church of England, a proposal which he declined. While in London he became intimate with Dr. Johnson, Dr. Porteus, and other distinguished literary characters. In 1783, he published 'Dissertations, Moral and Critical,' and the 'Evidences of the Christian Religion,' written at the request of the bishop of London. In 1790 he published the first volume, and in 1793 the second, of his 'Elements of Moral Science'; subjoined to the latter was a dissertation against the slave trade.

Beatty, John, American legislator: b. Bucks County, Pa., 10 Dec. 1749; d. Trenton, N. J., 30 May 1826. He was educated at Princeton, and took up the study of medicine with Dr. Rush of Philadelphia. He fought with distinction through the Revolutionary war, reaching the rank of colonel; was delegate to the Continental Congress in 1783-5, speaker of the House; served in the convention which adopted the Federal Constitution; was a member of Congress in 1793-5; and secretary of State of New Jersey in 1795-1805.

Beatty, bē'tī, John, American military officer: b. Sandusky, Ohio, 16 Sept. 1828. He fought on the Union side in the Civil War, rising from private to brigadier-general, and showing intrepid courage at Stone River, 1862-3. He was a member of Congress in 1868-74, and Republican presidential elector-at-large in 1884. He has written 'The Citizen Soldier; or, Memoirs of a Volunteer' (1876); 'The Belle o' Becket's Lane' (1882).

Beau Brummel. See BRUMMEL, GEORGE BRYAN.

Beaucaire, Monsieur, the principal figure in a story of the same name by Booth Tarkington (1900), dramatized 1901. Beaucaire is a French prince living incognito in the fashionable society of Bath, England, near the end of the 18th century.

Beaucaire, bō-kār, a small, well-built, commercial city of France, in the department of the Gard, on the Rhone opposite Tarascon, with which it communicates by a fine suspension-bridge, at the commencement of the Beaucaire and Aigues-Mortes Canal, and connected with several lines of railway. It has a commodious harbor for vessels which come up from the Mediterranean, seven leagues distant, considerable commerce and some manufactures; but is chiefly famous for its great fair (founded in 1217, by Raymond II., Count of Toulouse), held yearly from 21 to 28 July. Merchants from all parts of Europe, and even from the coast of Africa, attend with their goods; and almost every kind of article, however rare, is to be purchased here; though silks, woolens, printed cottons, leather, wool, wine, brandy, olive-oil, and fruits, are the chief objects of sale. Pop. (1890) 9,020.

Beauchamp, bō-shān, Alphonse de, French historian and publicist: b. Monaco, 1767; d. Paris, 1 June 1832. Under the Directory he had the surveillance of the press, a position which supplied him with materials for his 'History of La Vendée' (1806). He contributed to the 'Moniteur' and the 'Gazette de France.' Among his chief works are the 'History of the Conquest of Peru' (1807); the 'History of Brazil' (1815); and the 'Life of Louis XVIII.' (1821); 'Life of Julius Cæsar' (1821). The 'Memoirs of Fouche' is also with reason ascribed to him.

Beauchamp, bēch'am, William Martin, American clergyman and author. b. Coldenham, N. Y., 25 March 1830. Ordained to the Protestant Episcopal ministry in 1863, he filled rectorships at Northville, N. Y., 1863-5, and Baldwinville, N. Y., 1865-1900. He has published 'The Iroquois Trail; or Foot Prints of the Six Nations' (1892); 'Indian Names in New York' (1893); and a valuable series of archæological studies published as Bulletins of the New York State Museum, namely, 'Aboriginal Chipped Stone Implements of New York' (1897); 'Polished Stone Articles used by the New York Aborigines' (1897); 'Earthenware of the New York Aborigines' (1898); 'Aboriginal Occupation of New York' (1900); 'Horn and Bone Implements of the New York Indians' (1902); 'Metallic Bone Implements of the New York Indians' (1902).

Beauclerk, bō'klark, Topham, one of Dr. Johnson's favorite friends: b. December 1739; d. 11 March 1780. He was the only son of Lord Sidney Beauclerk, third son of the first Duke of St. Albans, and in general appearance much resembled his great-grandfather, Charles II. He studied at Oxford, and his conversational talents so much charmed Johnson that when "The Club" was founded, in 1763, he was one of the nine members who originally formed it. When he went to Italy, in 1762, Johnson wrote to his friend Baretti, warmly commending Beauclerk to his kindness. In 1765 he accompanied Johnson on a visit to Cambridge. A short time before his death, Johnson said of him: "He is always ready to talk, and is never exhausted"; and when communicating his death to Boswell, he said: "His wit and his folly, his acuteness and maliciousness, his merriment and reasoning, are now over. Such another will not often be found among mankind."

BEAUFORT — BEAUHARNAIS

Beaufort, bô-fôr, **François de Vendôme** (DUC DE), French naval officer, grandson of Henry IV.: b. Paris, January 1616; d. 25 June 1669. He is peculiarly known by the conspicuous part he took in the civil war of the Fronde. On the accession of Louis XIV., the queen-regent treated him very favorably, but was soon dissatisfied with his impertinent manners. Her displeasure threw him on the side of the malcontents, and he became one of the leaders of the Frondeurs. He was extremely popular with the Parisians, and was consequently called *le roi des halles*, and he exercised a powerful influence on the common people against Cardinal Mazarin, who was twice driven out of France. In 1664 and 1665 he successfully led attacks against the corsairs of Africa; in 1666 was at the head of the fleet which was to join the Dutch to make war against England; lastly, in 1669 he went to the assistance of the Venetians, then besieged by the Turks in the island of Candia; fought bravely and was killed in a Sally.

Beaufort, bû'fert, or bô'fert, **Henry**, English cardinal, natural son of John of Gaunt, and half-brother of Henry IV., king of England; d. Winchester, 11 April 1447. He became bishop of Lincoln, 1398, whence he was translated to Winchester, and in 1403 was made chancellor. In 1426 he received a cardinal's hat, and was appointed legate in Germany. In 1431 he crowned Henry VI. in Paris. Shakespeare depicts him in his 'Henry VI,' but it is questionable whether the likeness is true to history.

Beaufort, Margaret, English countess. b. 1441; d. 1509. She was daughter of John, first Duke of Somerset, and mother of Henry VII., king of England. She was three times married, namely, to Edward Tudor, Earl of Richmond, in 1455; Henry Stafford, son of the Duke of Buckingham, and to Lord Stanley, a minister of Edward IV. In the Wars of the Roses, she and her son Henry became more or less dangerous to the Yorkists and were for a long time in retirement or exile.

Beaufort, bû'fert, N. C., city, port of entry and county-seat of Carteret County, at the mouth of Newport River, 167 miles east of Raleigh. The harbor here is the finest in the State. At Cape Lookout, 11 miles to the southeast, is a lighthouse 156 feet high. Pop. (1900) 2,195.

Beaufort, S. C., a town and county-seat of Beaufort County; on the Port Royal River, and the Charleston & W. C. R.R.; 15 miles from the ocean and 80 miles southwest of Charleston. It is midway between Charleston and Savannah; has an excellent harbor, and is the centre of the phosphate trade of the State. It was founded in 1711, and for many years prior to the Civil War was a noted health and pleasure resort, especially for the cotton planters interested in the plantations on the adjoining Sea Islands. It is still a popular summer and winter resort, principally engaged in phosphate mining, and with large exports of cotton, yellow pine and cypress lumber, rice, and sweet potatoes. In the fiscal year ending 30 June 1900, the imports of merchandise here aggregated in value \$81,042, and the exports, \$181,908. Pop. (1900) 4,110.

Beaufort Scale, an instrument for measuring the apparent force of the wind, so called

from Admiral Beaufort who introduced it into the English navy about 1805. It is now in common use among navigators. Twelve numbers are embraced in the scale.

Beaugency, bô-zhôn-se, a town of France, in the department Loiret, 16 miles southwest of Orleans, on the side of a hill, above the Loire, here crossed by a stone bridge of 26 arches. The town was formerly surrounded by a wall flanked by towers and bastions, parts of which still remain. The square donjon tower of Beaugency, 115 feet high, is a remarkable structure of high antiquity, probably of the 10th or 11th century, though the exact date of its erection is unknown. The articles manufactured here are principally cloth and leather. There are also some distilleries and a considerable trade in wine. In the Franco-German war Gen Chanzy was defeated here by the Grand-Duke of Mecklenburg on 7 and 8 Dec. 1870. Pop. (1896) 3,305.

Beaugrand, bô-grañ, **Honoré**, Canadian journalist. b. Lanoraie, P. Q., 24 March 1849. In 1865 he joined the French army in Mexico under Marshal Bazaine, and, after the failure to establish Maximilian as emperor, accompanied the army to France. In 1867 he went to New Orleans, where he engaged in newspaper work. He served subsequently as a journalist in Boston and St. Louis, and, returning to Canada, founded *La Patrie* in Montreal in 1879, as an organ of the French Liberal Party. He sold this paper in 1897. In 1887 he established a paper in the English language, the *Montreal Daily News*. He was mayor of Montreal 1885-7, and a delegate from Montreal to the Congress of the World's Chambers of Commerce in London in 1896. His publications include 'Melanges, Trois Conférences' (1888); 'Lettres de Voyage' (1889); and a novel, 'Jeanne la Fileuse.' He was decorated with the Cross of the Legion of Honor in 1885, and became commander of that order in 1889. He is also an officer of the Academy of France; a commander of the Order of Nicham Iftikar of Tunis, etc.

Beauharnais, bô-är-nä, **Alexandre** (VISCOUNT DE), French soldier: b. Island of Martinique, 1760; d. Paris, 23 July 1794. He served with distinction as major in the French forces under Rochambeau which aided the United States in their Revolutionary War, and married Joséphine Tascher de la Pagerie, afterward the wife of Napoleon. At the breaking out of the French Revolution he was chosen a member of the National Assembly, of which he was for some time president, and which he opened, after the king's departure, with the following words: "*Messieurs, le roi est parti cette nuit passons à l'ordre du jour.*" In 1792 he was general of the army of the Rhine, but retired in 1793, in consequence of the decree removing men of noble birth from the army. He was falsely accused of having promoted the surrender of Mainz, was sentenced to death, and guillotined. His children, Eugène and Hortense, were adopted by Napoleon on the latter's marriage to Beauharnais's widow.

Beauharnais, Eugene de, French general: b. 3 Sept. 1781; d. Munich, 21 Feb. 1824. He was the son of Alexandre Beauharnais, who was guillotined in 1794, and Joséphine Tascher de la Pagerie, afterward wife of Napoleon and

BEAUHARNAIS — BEAUMARCHAIS

Empress of France. During the French Revolution Eugene entered the military service, and after his father's death joined Hoche in La Vendée, and subsequently studied for a time in Paris. In 1796 Joséphine was married to Napoleon Bonaparte, then commander-in-chief of the army of Italy, and Eugene accompanied the great warrior in his campaigns in Italy and Egypt. In 1805 he was created a prince of France and viceroy of Italy, and after the peace of 13 Jan. 1806, married the Princess Augusta Amelia of Bavaria. In 1807 Napoleon made him Prince of Venice, and declared him his heir to the kingdom of Italy. He administered the government of Italy with great prudence and moderation, and was much beloved by his subjects. He conducted himself with great prudence on the occasion of the divorce of Napoleon from his mother. In the disastrous retreat from Moscow he did not desert the wrecks of his division for a moment, but shared its toils and dangers with the soldiers, and encouraged them by his example. To him and to Ney France was indebted for the preservation of the remains of her army during that fatal retreat. On the departure of Napoleon and Murat he was left in the chief command, and showed great talent at that dangerous conjuncture, and at the battle of Lutzen, 2 May 1813, by surrounding the right wing of the enemy, he decided the fate of the day. Napoleon sent him from Dresden to the defense of Italy, and after the fall of Napoleon he concluded an armistice with Count Bellegarde, by which he delivered Lombardy and all upper Italy to the Austrians. Eugene then went immediately to Paris, and thence to his father-in-law at Munich. He was at the Congress of Vienna. On the return of Napoleon from Elba he was obliged to leave Vienna and retire to Baireuth. By an ordinance of the king of Bavaria, his father-in-law, he was created Duke of Leuchtenberg, November 1817. The Bavarian principality of Eichstadt was bestowed upon him, and his posterity declared capable of inheriting in case of the failure of the Bavarian line. Prince Eugene, under a simple exterior, concealed a noble character and great talents. Honor, integrity, humanity, and love of order and justice were the principal traits of his character. Wise in the council, undaunted in the field, and moderate in the exercise of power, he never appeared greater than in the midst of reverses. See Aubriet, *Vie Politique et Militaire d'Eugène Beauharnais, Vice-roi d'Italie*.

Beauharnais, François (MARQUIS DE), French nobleman: b. La Rochelle, 12 Aug. 1756; d. Paris, 10 Jan. 1819. He violently opposed the motion of his younger brother, the Viscount Alexandre, to take from the king the chief command of the army, and would not listen to any of the amendments proposed, saying, "*Il n'y a point d'amendement avec l'honneur.*" He was called in consequence of this, *Le féal Beauharnais sans Amendement*. In 1792 he formed the project of a new flight of the royal family; but the arrest of his companion, the Baron Chambon, prevented the execution of the plan. He was appointed major-general in the army of the Prince of Condé, and wrote, in 1792, to the president of the National Assembly, protesting against their unlawful treatment of the king, and offering to appear himself among his defenders. When Bonaparte became first consul, the marquis sent him a letter, in which

he exhorted him, by the glory which he would gain by such a course, to restore the sceptre to the house of Bourbon. Having at last recognized the emperor he was sent by him as ambassador to Florence and Madrid; but having afterward fallen into disgrace he was banished.

Beauharnais, Hortense Eugénie, wife of Louis Bonaparte, and queen of Holland: b. Paris, 10 April 1783; d. Arenenberg, Switzerland, 3 Oct. 1837. She was the daughter of Alexandre Beauharnais and Joséphine, afterward wife of Napoleon. She was to have married Desaix; but on 7 Jan. 1802, in compliance with the wish of Napoleon, became the wife of Louis, who also gave up a former attachment for the marriage. The union was not happy; and Hortense returned to Paris, and lived a dissolute life there apart from her husband. Prominent among her lovers was the Comte de Flahaut, for whom she composed her popular air, "*Partant pour la Syrie*," as he was leaving Paris for Germany, and Admiral Veruel, a Dutch naval officer. The former is believed to have been the father of M. de Morny, universally recognized as the illegitimate half-brother of Napoleon III, whom he greatly aided in becoming emperor; and to the latter is attributed the paternity of Napoleon III. himself. It is known that Louis Bonaparte had a warm dispute with his brother, the emperor, touching this child, which he averred to be none of his, and that his unwillingness to recognize it as such was only overcome by the most decided measures on the part of Napoleon. After the separation of Napoleon and Joséphine, Hortense remained on intimate terms with the former. When the Bourbons came back in 1814, she alone of all the Bonaparte family remained in Paris. After the Hundred Days, she lived in Augsburg, in Italy, and in Switzerland, devoted to her sons, and greatly beloved by the people with whom she came in contact, who found her a kind and gentle benefactress. When her sons had to flee, after participating in an unsuccessful attempt at revolution, in Italy, in 1831, she went for a time to Paris, and was kindly received by Louis Philippe. She possessed much literary, as well as social talent.

Beaulieu, bō-lyè, Jean Pierre, Austrian military officer: b. Namur, 26 Oct. 1725; d. near Linz, Austria, 22 Dec. 1819. He served in the Seven Years' war; was promoted a major-general for his successful operations against the Belgian insurgents in 1789; commanded at Jemappes in 1792; was defeated by Napoleon, in 1796, while commander-in-chief of the forces in Italy, in the battles of Montenotte, Millesimo, Montesano, Mondovi, and Lodi.

Beaulieu, bū'li, a village in Hampshire, England, six miles southwest of Southampton. It contains the remains of an abbey founded by King John and much visited by students of mediæval architecture. Within the limits of Beaulieu Manor exemption from arrest for debt was enjoyed till very recent years.

Beaumarchais, bō-mar-sha, Pierre Augustin Caron de, French dramatist: b. Paris, 1732; d. May 1799. He was the son of a watchmaker, who destined him for his trade, and early gave striking proofs of his mechanical and also of his musical talents. He was afterward the teacher of the harp to the daughters of Louis XV., and was admitted into their society.

BEAUMARIS — BEAUMONT

By a rich marriage he laid the foundation of the immense wealth which he afterward accumulated by his speculations, and which was also increased by a second marriage. In the meantime he occupied himself with literature and published the dramas of 'Eugénie' (1767), and 'Les Deux Amis' (1770). The first still holds its place on the stage. He showed all his talents in his lawsuit against Goezman and Lablache, when he wrote against the former (who belonged to the *parlement Maupeou*, so called, which was engaged in a dispute with the ministry) his celebrated 'Mémoires' (1774), which entertained all France. The fame of his 'Mémoires' alarmed even Voltaire, who was jealous of every kind of glory. 'The Barber of Seville' (1775) and the 'Marriage of Figaro' (1784) have given him a permanent reputation. In 1792 he wrote 'La Mère Coupable,' but never regained his former fame. His last work was 'Mes Six Epoque,' in which he relates the dangers to which he was exposed in a revolution in which a celebrated name, talent, and riches, were sufficient causes of proscription. He still possessed, at the age of more than 60, all the vigor of his youth, but was afflicted with deafness. He lost about 1,000,000 livres by his famous edition of the works of Voltaire (1785), and still more at the end of 1792 by his attempt to provide the French army with 60,000 muskets. In 1809 an edition of his works appeared in seven volumes; a later edition in one volume came out in 1835. Beaumarchais was a singular instance of versatility of talent, being at once an artist, politician, projector, merchant, and dramatist. He was passionately fond of celebrity. His 'Marriage of Figaro' excited one of those extraordinary sensations for which Paris has always been remarkable. The English modifications and versions of this comedy convey but a slight notion of the mischievous subtlety and deep spirit of intrigue in the original. See Loménie, 'Beaumarchais et son temps'; 'Beaumarchais et ses œuvres' (1887); 'Histoire de Beaumarchais' (1886); Lescure, 'Eloge de Beaumarchais' (1887); Bonnefou, 'Etude sur Beaumarchais' (1887); Hallays, 'Beaumarchais' (1897).

Beaumaris, bō-mār'is, a seaport town of North Wales, Isle of Anglesey. It is situated on the west shore of the Menai Strait, near its junction with the Irish Sea, where it expands into a good roadstead called Beaumaris Bay. It consists of several well-paved streets; houses in general, good, particularly in the principal street, terminated by the ancient castle of Beaumaris, erected by Edward I.; while many modern dwellings of very handsome appearance have lately been erected. The chief public buildings, exclusive of the churches, are the town-hall, a commodious and handsome edifice, the county-hall, the grammar-school, police office, and public library. The chief place of worship is the Church of St Mary, a spacious and elegant structure in the later style of English architecture, with a lofty, square, embattled tower; and several chapels. The harbor is safe and commodious, and may be entered at any state of the tide. Beaumaris is now a favorite watering-place. Pop. (1901) 2,310.

Beaumont, bō'mōnt, Francis, and Fletcher, John, two eminent English dramatic writers, whose names are linked together for all time.

The former b. 1586, 10 years after the latter, d. 1615, 10 years before him. His family had its seat at Grace-Dieu, in Leicestershire, where he was born, and his father became a judge of the Common Pleas. He entered Broadgate Hall (now Pembroke College), Oxford, as a gentleman-commoner in 1596, and afterward studied law for a short time at the Inner Temple. At the age of 16 he published a translation, in verse, of Ovid's fable of Salmacis and Hermaphroditus, and before 19 became the friend of Ben Jonson. He married Ursula, daughter and co-heir of Henry Isley of Sundridge, in Kent, by whom he left two daughters. He was only 29 years old when he died. He was buried near the entrance of St. Benedict's Chapel, in Westminster Abbey, but his resting-place is marked by no monument. **JOHN FLETCHER**, b. London, 1576; d. London, August 1625. His father was a dignitary of the Church, who, after having been dean of Peterborough, was appointed bishop of London. The poet was admitted to Bene't College, Cambridge, in 1591, where he is said to have acquired a large amount of classical lore. 'The Woman-Hater,' produced in 1606-7, is the earliest work known to exist in which he had a hand, but it is probable that he wrote before this. Little is known of the circumstances in which his life was passed. It does not appear that he was ever married. He died in London of the plague in his 49th year, and was buried at St. Saviour's, Southwark. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names consist of 52 plays, a masque, and some minor poems. The masque was written by Beaumont alone, and it is believed that all the minor poems except one are his also. He is said to have had a share in only 17 of the 52 plays, but it is difficult and indeed impossible to determine with certainty the respective shares of the two poets in these productions. According to the testimony of some of their contemporaries, Fletcher was the inventing genius, while Beaumont, though the younger, was more distinguished for maturity and correctness of judgment. Shakespeare was their model, and, like him, they intermix pathetic and low comic scenes; but their attempts to surpass their model sometimes lead them into extravagances. Shakespeare is believed by some critics to have had a hand as well as Fletcher in the composition of the fine play of the 'Two Noble Kinsmen,' founded on Chaucer's 'Knight's Tale.' Their contemporaries preferred them even to Shakespeare, affirming that the English drama reached its perfection in them. Impartial posterity has reversed this decision, and adjudged the palm to Shakespeare. Their writings like those of the majority of their contemporaries, are greatly disfigured by coarseness and indecency. They are said to have frequented taverns and alehouses to study the human character, and to have been arrested while disputing in such a place respecting the conclusion of a play. One wished to have the king in the piece to be assassinated, the other opposed it; and being overheard, they were apprehended on suspicion of conspiring the death of their sovereign. Among the best of their plays are the tragedies of 'Valentinian'; 'Thierry and Theodoret';

BEAUMONT

'King and No King'; 'Philaster'; and the 'Maid's Tragedy'; the comedies 'Rule a Wife and Have a Wife'; 'Wit Without Money'; 'The Knight of the Burning Pestle'; 'The Spanish Curate'; 'The Scornful Lady'; and the pastoral tragi-comedy in rhyme of the 'Faithful Shepherdess,' which last, however, is mainly the work of Fletcher. Scattered throughout the various plays are to be found some of the most melodious of English lyrics. The works of Beaumont and Fletcher in 11 volumes edited by Dyce, append. (1843-6). See Macaulay, 'Francis Beaumont: a Critical Study' (1883).

Beaumont, Sir George Howland, English art patron. b. Dunmow, Essex, 6 Nov. 1735, d. 7 Feb. 1827. He possessed considerable skill as a landscape painter, but was noted more especially as a munificent patron of the arts. The establishment of the National Gallery was mainly owing to his exertions, and 16 of its fine paintings, chiefly landscapes, including one by N. Poussin, three by Claude, and the 'Blind Fiddler' of Wilkie, were his gifts. Wordsworth dedicated to him his 'Elegiac Musings' (1830).

Beaumont, bō-môn, Gustav Auguste de la Bonniere de, French publicist. b. 16 Feb. 1802; d. Tours, 6 Feb. 1866. He early entered upon the legal profession, and, in 1831, was sent with De Tocqueville to study the penitentiary system of the United States. He was elected deputy in 1839, and, in 1848, vice-president of the Constituent Assembly. He was subsequently ambassador to London and Vienna. Beaumont first became known as a writer by his publishing, in conjunction with M. de Tocqueville, 'Traité du Système Pénitentiaire aux États-Unis et de son application à la France' (1832). Among his other works may be named, 'Marie, ou l'Esclavage aux États-Unis' (1835) — a work somewhat resembling 'Uncle Tom's Cabin'; and 'L'Irlande sociale, politique, et religieuse' (1839).

Beaumont, Jean Baptiste Elie de, French geologist. b. Canon, 1798, d. 22 Sept. 1874. He taught geology in the École des Mines and Collège de France, was elected to the Academy in 1835, and became, in 1856, its perpetual secretary. His theory regarding the elevation of mountain systems has as yet found little acceptance outside France. With Dufrenoy he prepared a great geological map of France (1840). Another work is his 'Notice sur les Systèmes des Montagnes' (1852).

Beaumont, bō'mönt, Sir John, English poet. b. Leicestershire, 1582; d. about 1627. He was an elder brother of Francis Beaumont, the dramatist, and studied at Broadgate Hall (now Pembroke College), Oxford. In 1605 he succeeded to his father's estates on the death of his elder brother. He began writing poetry at a comparatively early age, and in 1602 published anonymously a mock-heroic piece entitled 'The Metamorphosis of Tobacco'. He was created a baronet in 1626. In 1629 his son, Sir John, published a collection of his poems under the title 'Bosworth Field, with a Taste of the Variety of other Poems left by Sir John Beaumont.'

Beaumont, Joseph, English poet. b. Hadleigh, Suffolk, 13 March 1616; d. 23 Nov. 1699. He was educated at Peterhouse College, Cambridge, where he gained great distinction.

Elected a Fellow in 1636, he was ejected with others in 1644 owing to royalist sympathies, and while living in retirement wrote 'Psyche,' an epic poem (1648). On the restoration of the monarchy he became a royal chaplain, and after a brief term as master of Jesus College he was appointed in 1663 master of Peterhouse. He received the regius professorship of divinity at Cambridge in 1674.

Beaumont, William, American surgeon: b. Lebanon, Conn., 1785; d. St. Louis, 25 April 1853. He is principally noted for his discoveries regarding the laws of digestion and for his experiments upon the body of Alexis St. Martin. In 1822 Beaumont was stationed at Michilimackinac, Michigan. On 6 June, St. Martin, a young man 18 years of age, in the service of the American fur company, was accidentally shot, receiving the whole charge of a musket in his left side, from a distance of about one yard, carrying with it portions of his clothing, and fracturing two ribs, lacerating the lungs, and entering the stomach. Notwithstanding the severity of the wound, Beaumont undertook his cure, and by careful and constant treatment and attention, the following year found him enjoying good health with his former strength and spirits. In 1825 Beaumont began a series of experiments upon the stomach of St. Martin, showing its operations, secretions, the action of the gastric juices, etc.; these experiments he was obliged to discontinue after a few months, but renewed them at various intervals until his death; his patient during so many years presenting the remarkable spectacle of a man enjoying good health, appetite, and spirits, with an aperture opening into his stomach two and a half inches in circumference, through which the whole action of the stomach might be observed. The result of his experiments was published in 1833, and has been recognized throughout the medical world as a valuable addition to science.

Beaumont, bō-mönt', Texas, a city and county-seat of Jefferson County, on the Neches River and several railroads; 80 miles northeast of Houston. It is an important shipping point; is at the head of tidewater navigation; and has a variety of important manufactures. Oil was discovered in the Beaumont fields in 1901, when there was rapidly opened a series of the most remarkable gushers ever known in the history of the industry. That oil was there had been long known, and several men had lost fortunes in trying to get at it, but it was not until the wells were sunk on Spindle Top that success came. The structure of Spindle Top appears to be that of a dome with steep sides and rather flat summit. Judging from the normal thickness of the Gulf Coastal Plain formations, and from the structure of the Spindle Top pool, it seems evident that a well in this region less than 3,000 feet in depth does not reach the oil-bearing horizon anywhere except upon the Spindle Top dome. The shallow dry wells already drilled outside of Spindle Top prove but little. One co-operative test well put down at some carefully selected locality to a depth of 3,000 or 3,500 feet would probably be of much greater value than a large number of shallow wells put down in various localities. The discovery of oil has had a marvelous effect upon property in this region, and the city has since grown very rapidly. Pop. (1900) 9,427.

BEAUNE — BEAUVAIS

Beaune, bôn, **Florimond de**, French mathematician: b. Blois, 1601; d. there, 1652. He materially developed the Descartes method in geometry and was the first to treat systematically the question of superior roots of numerical equations. What is styled "Beaune's Problem," solved only by Jean Bernouilli, depends on the determination of a curved line from the property of its tangent.

Beaune, a town of France, in the department Côte d'Or, 23 miles south-southwest of Dijon. It is surrounded with planted ramparts, which furnish a pleasant promenade; is well built, and has a notable Church of Notre Dame, dating from the 12th century, and a large hospital, founded in 1443 by Nicholas Rollin, chancellor of Philip the Good, Duke of Burgundy. Beaune has also a public library containing about 50,000 volumes with 500 manuscripts, a very fine public garden, a theatre, etc. Its manufactures, though still of some importance, have never recovered the shock received by the revocation of the Edict of Nantes, when 200 Calvinistic families, who gave employment to 2,000 workmen, were driven into exile. The trade is chiefly in Burgundy wines, to one of which the town gives its name, and in agricultural produce. There is a statue, erected in 1849, to the mathematician Monge, who was born here. Pop. (1896) 11,808.

Beauregard, bô're-gard, **Pierre Gustave Toutant**, American Confederate general: b. New Orleans, 28 May 1818; d. there, 20 Feb. 1893. After studying military science at West Point he joined the artillery, but was afterward transferred to the engineers. In the Mexican war of 1846-7 he distinguished himself, and was promoted major. On the outbreak of the Civil War he resigned in order to enter the Confederate army, and was placed in command of the city of Charleston, South Carolina. On 12 April 1861 he reduced Fort Sumter, and later in the same year led the Confederates to victory in the battle of Bull Run. At the battle of Shiloh in the following year he assumed the command on the death of Gen. A. S. Johnston, but though very successful on the first day he was ultimately compelled to retreat to Corinth, Miss., which he had to evacuate shortly afterward. From September 1862, till April 1864, he defended Charleston against the siege operations of Gen. Gillmore and Admirals Dupont and Dahlgren. In October 1864, became commander of the military division of the West, in which capacity he strove without success to resist Sherman's victorious advance, and in April 1865 he and J. E. Johnston surrendered. He was afterward a railroad director, adjutant-general of Louisiana, and manager of the Louisiana State Lottery. In 1866 the chief command of the Rumanian army was tendered him, and in 1869 that of the army of the khedive of Egypt, both of which he declined. He published 'The Principles and Maxims of the Art of War' (1863), and 'Report of the Defense of Charleston' (1864).

Beaurepaire-Rohan, bô-r'-pâr-rô-ân, **Henriques de**, Brazilian geographer of French extraction: b. province of Piauh, about 1818; d. 1894. He traveled extensively in the region south of Rio de Janeiro, publishing the results of his tour in a volume called 'Descrição de uma viagem de Cuyaba' ao Rio de Janeiro'

(1846). The Brazilian government subsequently employed him to gather statistics relating to the interior provinces, and he was at one time lieutenant-general in the Brazilian army. His *Estudos acerca da organização da Carta geographica e da historia physica e politica do Brazil* (1877) is a work of great importance.

Beausobre, bô-sôbr, **Isaac de**, French Protestant historian: b. Niort in France, 1659; d. Berlin, 1738. He was at first intended for the law, but his own inclinations were decidedly in favor of the Church; and in 1683 he became Protestant minister of Chatillon-sur-Indre. In the persecuting spirit of the time the Church had been closed by fixing the royal seal upon the gate. Beausobre held special services in his own house, and being for this reason obliged to flee, sought an asylum at Rotterdam. Shortly after he became chaplain to the Princess of Anhalt at Dessau, which he quitted in 1694, when he became minister to French Protestants at Berlin. He enjoyed much of the favor both of Frederick William I. and of the crown-prince, afterward Frederick the Great. His most remarkable work is the 'Histoire Critique de Manichée et du Manichéisme' (1734); and he also wrote 'Histoire de la Réformation' (1785-6).

Beautiful Snow, a popular poem first published in 'Harper's Weekly' in 1858. Its authorship has had various claimants but has been definitely assigned to John W. Watson.

Beauty and the Beast, an ancient story very evidently a myth of the Sun and the Dawn. In all the variants the hero and the heroine cannot behold each other without misfortune. One of the earliest forms of the story is the Vedic myth of 'Urvasi and Purúravas'. Another is the Sanskrit Bheki, who marries on condition she shall never see water; thus typifying the dawn, vanishing in the clouds of sunset. In Greek myths we find a resemblance in some features of 'Orpheus and Eurydice'; and the name of Orpheus in its Sanskrit form of Arbhu, meaning the sun, hints quite plainly at a solar origin of this cycle of tales. A more marked likeness exists in the myth of Eros and Psyche by Apuleius, and in the Scandinavian tale of the 'Land East of the Sun and West of the Moon,' related by Morris in 'The Earthly Paradise.' More or less striking parallels are seen in the Celtic 'Battle of the Birds'; in the 'Soaring Lark,' by Grimm; in the Kaffir 'Story of Five Heads'; in Gaelic, Sicilian, and Bengal folk-lore; and even in as remote a quarter as Chile. The tale is told in Straparola's 'Piacevoli notti' (1550); in Madame Villeneuve's 'Contes Marines' (1740), and is the basis of Gretry's opera, 'Zémise et Azor.'

Beauty. See **ÆSTHETICS**; **ART**.

Beauvais, bô-vâ (ancient BRATSPANTUM, BELLOVACUM), a town of France, capital of the department of Oise, 54 miles north of Paris. It stands in a rich valley enclosed by wooded hills, at the confluence of the Avelon with the Thérain; and though poorly built, derives great interest from its antiquity. It existed in the time of the Romans, and in 1472 resisted an army of 80,000 Burgundians under Charles the Bold. The principal edifice is the unfinished cathedral of Saint Pierre, consisting of choir and transept. It has the loftiest stone vault in the world, and beautifully painted glass, exe-



GENERAL P. G. T. BEAUREGARD.

BEAUVOIS — BEAVER

cuted by the most celebrated masters of the art. The choir was built in 1225-72. The town-house is the finest modern structure. The principal manufacturing establishment is the Gobelins branch tapestry and carpet manufactory, famed for the beauty of its products, and employing about 400 hands; and there are also manufactures of woollens, buttons, brushes, gold and silver lace, etc. It has also large bleachfields, tanneries, and dyeworks. Beauvais is the seat of a bishop, and had a population in 1896 of 16,371.

Beauvois, bō-vwa, Ambrose Joseph Palisot de, French naturalist: b. Arras, 1752; d. 1820. He visited Africa, the West Indies, and America, in connection with his favorite pursuits in natural history, and was rewarded by the discovery of the jaws and molar teeth of the great mastodon, on the banks of the Ohio. He afterward returned to France, and devoted the remainder of his life to the arrangement and publication of his collections. Comparatively few of them had arrived in safety, but out of the wreck he managed to procure materials for the important publications on which his fame chiefly rests. The most valuable is his 'Flore d'Oware et de Benin'. One of the most curious plants contained in it has been named after him *Belvisia*.

Beaux, bō, Cecilia, American artist: b. in Philadelphia. She studied under William Sartain, and at Paris. She has four times gained the Mary Smith Prize of the Pennsylvania Academy of Fine Arts, and has been awarded the same academy's gold medal and Temple gold medal. She has received similar honors from the National Academy of Design, the Philadelphia Art Club, Carnegie Institute, and the Paris Exposition of 1900.

Beaux-arts, bō-zar, Academie des. See ACADEMY OF FINE ARTS, THE.

Beaux' Stratagem, a well known comedy by the English dramatist, George Farquhar (q v).

Beaven, Thomas, American Roman Catholic prelate: b. Springfield, Mass., 1849. He was educated at the Jesuit colleges of Holy Cross, Worcester, Mass., and Georgetown, D. C. After holding pastorates at Spencer and Holyoke, Mass., was consecrated Bishop of Springfield in 1892.

Beaver, James Addams, American military officer and statesman: b. Millerstown, Pa., 21 Oct. 1837. He was graduated at Jefferson College, Canonsburg, Pa., in 1856; and for a time practised law. He served in the Federal army, 1861-4; and was retired with the rank of brigadier-general of volunteers (22 Dec. 1864). He then resumed the practice of law; became major-general of the Pennsylvania State militia; was defeated as Republican candidate for governor in 1882; elected in 1887; president of the board of trustees of the Pennsylvania State College; vice-moderator of the Presbyterian General Assembly in 1888 and 1895; and member of the President's commission on investigation of the War Department in 1898.

Beaver, Philip, English naval officer: b. in Lewknor, Oxfordshire, England, 28 Feb. 1766; d. Table Bay, South Africa, 5 April 1813. He served during the American Revolutionary War in the royal navy. After the war he under-

took to establish an agricultural colony on Bulama Island, on the west coast of Africa, and in April 1792 left England with three ships and 275 white colonists, expecting that the latter would not only cultivate the soil, but would do much toward civilizing the negroes. The enterprise proved a failure and he returned to England in 1794. Subsequently he distinguished himself in the naval service.

Beaver, Pa., a borough and county-seat of Beaver County, on the Ohio River, and the Pennsylvania and the Pittsburg & L. E. RR's; 28 miles northwest of Pittsburg. It has natural gas, abundant water power, large coal and oil shipping interests, a public park, national bank, and daily and weekly newspapers, and is the seat of Beaver College (Methodist Episcopal). Pop. (1900) 2,348.

Beaver, a large aquatic rodent animal of the northern part of the world, named by Linnaeus, *Castor fiber*, and representing the family *Castoridae*. It is distinguished from its nearest relatives, the marmots, not only by adaptation to an aquatic life, and the possession of large, fully webbed hind feet, which form the principal instrument for swimming, but especially by its extraordinary tail, which is exceedingly broad and covered with a horny integument resembling scales. A large beaver is about two feet in length from the root of the tail to the nose, and the tail will be nearly a foot long. Such a one will weigh about 35 pounds. Its flesh is edible, but not particularly good. The fur is exceedingly close and fine, and when freed from the long hairs that are scattered through it and overlie the under coat, forms one of the most valuable furs of commerce and one which figured largely in the early history of North America. It is owing, indeed, to the eagerness with which men have sought for this valuable commodity, going farther and farther into the wilderness in search of the animal, that the beaver has almost disappeared from large regions where it was once numerous. Originally it was widespread throughout Europe and northern Asia, but became extinct in the British Islands in the 12th century, and it remains elsewhere in Europe only in a few of the wilder streams of Norway and some of the tributaries of the Rhone and the Danube, where it is under royal protection. In some cases colonies of captives have re-established themselves in parks, notably that of Lord Bute, in England. It still exists, however, in eastern Siberia, whence a large number of its skins are annually sent to market.

When America was first entered by Europeans, the beaver was found inhabiting almost all of the woodland streams of the whole northern continent, from the Arctic Circle down to Central Mexico. Its temperament and manner of life made it an easy prey, and prevented it from adapting itself to changed conditions as did its neighbor, the muskrat. It rapidly disappeared, therefore, wherever civilization progressed or trapping was systematically carried on, and now no beavers are to be found south of the rivers that flow into Hudson Bay, except in the northern parts of the Rocky Mountains and in a few remote and scattered places like the forests of Maine and the Lake Superior region, where they are more or less protected by law. A few survive, nevertheless, in the wild ranges

BEAVER

of the southern Alleghenies and along the borders of Mexico. The principal use to which beaver fur was put was for the making of hats; and it is probable that had not the method of making hat-coverings from silk been discovered, the animal would long ago have become extinct, and also its South American substitute, the coypu or nutria.

The life of the beaver is remarkably interesting on account of the skilful structures by which it keeps itself surrounded with a sufficient depth of water, and so maintains access to a continuous supply of food. The food of the beaver consists entirely of the bark of hardwood trees, such as the maple, linden, birch, poplar, and the like. It never eats the bark of the coniferous trees, and beavers are not found living in forests composed entirely of coniferous trees, nor are beavers able to live in a treeless country. They are gregarious and dwell in colonies, which in favorable circumstances, may persist for centuries. From time to time a pair of young beavers will wander away from such a colony and seek a new place in which to start afresh. They will choose a sluggish stream in the woods, preferably where the ground is low and level, and there will dig for themselves a burrow in the bank, the entrance of which is below the surface of the water. The tunnel will lead upward into the earth above the level of high water, and there be enlarged into a chamber in which will be placed a bedding of grass, etc. They are likely to make an opening from this chamber into the air, and, as if for defense or concealment, will pile over this opening a little heap of brush, in which perhaps may be seen the germ of the architectural ability which the species have so highly developed. It is necessary to their scheme of life that the water in the stream should never fall so low in summer as to expose the entrance of the burrow; moreover, it is necessary that this water should be so deep that in winter the ice will not freeze to the bottom, but that, on the contrary, there shall remain room enough between the ice and the bed of the creek for them to store there a supply of winter food. In order to maintain this requisite level of water the beavers throw a dam across the stream below their settlement, holding the water back to a sufficient height. For this purpose they choose a place where the water is not more than $2\frac{1}{2}$ feet deep and the bottom is firm, and beginning in the centre of the channel they place there, lengthwise of the current, a number of long sticks which they hold down by piling upon them mud and stones, moved into place with their dexterous fore feet. They procure these poles by cutting off small trees with their front teeth, which are exceedingly large and strong and are faced with a hard yellow enamel. As the back part of the tooth consists of softer material, it wears away more rapidly, leaving the front with a chisel-like edge, which is always sharp. Standing on their hind feet, they gnaw round and round the stem of a tree until it falls; and are able to cut down trees 18 inches in diameter, but this is only done in procuring their winter supplies. From its foundation in the centre the dam is carried each way to the shore. As the beavers increase in number and the young ones grow up, they settle in the immediate neighborhood until after a few years a considerable colony will have arisen. During all this time

work progresses upon the dam, each beaver gathering drift-wood, branches, and logs from the shore, stones, mud, pieces of sod, and everything available for the purpose, and working it into the structure of the dam. The work is carried on only at night and especially on pleasant moonlight nights, when they seem to be extremely busy from sunset till sunrise. There is no superintendence, but each one possessed with an instinct for industry, does whatever seems to it best. The result is a mere tangled heap, having a long slope and comparatively tight surface on the upper side, which sometimes in a low, swampy region, will stretch for several hundred feet and hold back a large pond or morass, largely grown up to grass, but having many channels running through it. Meanwhile each family of beavers has erected for itself upon the bank of the pond or upon some islet adjacent to one of the channels, a conical house or lodge, the interior of which may be a room six or seven feet in breadth, which has no opening into the air, but is entered from beneath the water by two channels, one of which is commonly used, while the other forms a means of escape in case of invasion by a mink or some other aquatic enemy. These houses are more solidly constructed than even the dam; and when frozen in winter are so thick and strong that nothing less than a bear is able to break into them. These houses are largest and strongest in the cold northern regions. During the summer beavers go ashore and obtain from time to time such bark as they want for food, and also feed largely upon the roots and stems of the flags, lilies, and other water plants. In winter, however, when the pond is covered with ice and the banks with snow, the beavers would be unable to obtain such food, and to escape starvation are obliged to store in the autumn a sufficient supply to last them through the winter. They do this by felling large trees near the water's edge and cutting them up into such portions as they can manage to roll or drag into the water. These are floated away and sunk at the doors of their houses, where they are weighted or stuck into the mud to prevent their floating away, until a sufficient pile has been procured. Piece by piece this store is taken into the house during the winter, and, the bark having been eaten off, the sticks are thrown out to be used in the spring as material for repairing and extending the dam.

It will be apparent that a colony of beavers would soon exhaust the supply of trees bearing edible bark within reach of the shore of their stream, unless they had some means of reaching new and more distant supplies. In truth, where the banks are steep, this soon happens, and the beavers must then seek a new place. Where the forest is low and level, however, they will excavate canals which are gradually extended farther and farther into the woods on each side of the pond, and so enable themselves to reach more and more fresh trees. In some of the swampy forests about the headwaters of the Mississippi which was perhaps the headquarters of beaver life in this country, these canals have been known to extend several hundred feet, and in such places colonies of beavers have maintained an existence of more than 200 years. These channels are kept free from weeds and of a proper depth; and the most important service which the dam renders is to maintain

BEAVER DAM—BEBEL

the right level of water in these canals, so that they may always be used as the avenues of the industrious community.

The American beaver seems to have carried its architectural work to a higher degree of perfection than the European beaver was ever known to do, although in Siberia, where similar climatic conditions prevail, and it is necessary for them to erect houses impervious to the great cold and to the attacks of marauding animals, they come near to equaling their American cousins. There is little record of such structures being made primitively in central Europe, and the beavers now living in the streams of Germany and Austria make few attempts at either dams or houses, but are content to dwell as the climate permits them to do, in their bank-burrows. It should be said, however, that much the same is true of the beavers of the more southerly parts of their range in the United States.

The substance called *castoreum* is obtained from two glandular pouches in the beaver, closely connected with the organs of reproduction, and probably of service in attracting the sexes to one another in the rutting season. It is a secretion having a powerful, peculiar, pungent odor, and was formerly in demand for medicinal purposes. At present its only use is as a scent-bait for traps. Fossil remains of beavers have been found as far back as the middle of the Tertiary period. Fossils of small-sized species, with some distinctive peculiarities occur in the Miocene rocks of the western United States; and a huge beaver (*Trogontherium*) existed in Europe in the Pliocene age.

Beaver Dam, Wis., a city of Dodge County, situated on Beaver Dam Creek, and on the Chicago, M & St. P. R.R. It is the seat of Wayland Academy, has a library of 10,000 volumes and several parks. It is in an agricultural district and has a considerable trade; it is also well provided with water power and has numerous manufacturing interests, including flour mills, iron works, machinery manufactures, etc. Pop. (1900) 5,128.

Beaver Dam Creek, Battle of. See MECHANICSVILLE, BATTLE OF.

Beaver Falls, Pa., a borough in Beaver County, on the Beaver River, near its junction with the Ohio, and on several railroads; seven miles north of Beaver, the county-seat, and 31 miles northwest of Pittsburgh. It has natural gas; good water power for manufacturing; produces steel, iron, wire, glassware, pottery, shovels, etc., and has two national banks, and a property valuation of about \$5,000,000. It is the seat of Geneva College (Reformed Presbyterian). Pop. (1900) 10,054.

Beaver Islands, a group of islands situated in the north part of Lake Michigan in Charlevoix County, and interesting as the scene of a short-lived Mormon colony. The largest town, Saint James, on Big Beaver Island, was settled in 1847 by James J. Strang, a Mormon elder, driven away from the parent Mormon community because his claims conflicted with those of Brigham Young. In the little colony which he called Saint James, after himself, Strang exercised the authority of king and high priest, and was implicitly obeyed. In 1849 he introduced polygamy, which did not spread rapidly and led to withdrawals and troubles with the "gentiles."

Strang was assassinated in 1856 and the colony dispersed. There are several lighthouses on the island. Pop. of Saint James (1900) 420; of Peaine township, 372.

Beaver Parasite, a species of beetle (*Platysyllus castoris*), representing the family *Platysyllidae*, related to burying beetle. Owing to its parasitic mode of life under the hair of the beaver it is very much modified and resembles a flattened flea. It is a parasite both in the larval and adult stages.

Beaver State, a popular designation of Oregon.

Beaverwood. See MAGNOLIA.

Bebber, Wilhelm Jakob van, Prussian meteorologist and writer: b. Grietham-Niederrhein, 10 July 1841. He was educated at Bonn University and for several years was a teacher. He became rector of the high school at Weissenburg-am-Sand in 1875. Since 1879 he has been chief of the weather telegraphing department of the German Seewarte at Hamburg. Among his works are a 'Hand-book of Practical Meteorology' (1885-6), and a 'Manual of Meteorology' (1890).

Bebeerine, an uncrystallizable basic substance, $C_{10}H_{15}NO_4$, extracted from the bark of the bebeeru or greenheart-tree (*Nectandra rodiei*), of Guiana. In pharmacy the sulphate of bebeerine is a valuable medicine, being used, like quinine, as a tonic and febrifuge. It can be given with advantage to patients who are unable to take sulphate of quinine. Unfortunately, owing to the supplies of the bark being uncertain, the drug is sometimes scarce and difficult to obtain. Bebeerine is thought, by some chemists, to be identical with buxine.

Bebeeru, a tree (*Nectandra rodiei*) of the laurel family. See GREENHEART.

Bebek, bā-bek', a beautiful bay on the European side of the Bosphorus, with a palace of the sultan, known as the Humayunabad, and built in 1725. Here also are the establishments for baking biscuits for the fleet, an American school, and a college of the French Order of Lazarists.

Bebel, bā'bél, Ferdinand August, German socialist: b. Cologne, 1840. He was apprenticed to the turner's trade, and acquired a practical knowledge of the difficulties and disabilities of workmen. He settled in Leipsic in 1860, joined various labor organizations, and became one of the editors of the *Volkstaat* and of the better known *Vorwärts*. Membership in the North German Reichstag was followed by his election to the German Reichstag, of which he was a member from 1871 to 1881, and which he entered again in 1883, being the acknowledged leader of his party therein. Bebel's earnestness, large sympathy, and wide range of knowledge impress his hearers, although his appearance and manner in the Reichstag did not at first win them. These qualities are also characteristic of his numerous published books, among which are: 'Our Aims' (1874); 'The German Peasant War' (1876); 'The Life and Theories of Charles Fourier' (1888); 'Women in Socialism, the Christian Point of View in the Woman Question' (1893).

Bebel, Heinrich, German humanist: b. 1472; d. 1518. He was an alumnus of Cracow and Basel universities, and from 1497 professor

of poetry and rhetoric at Tübingen. His fame rests principally on his 'Facetiae' (1506), a curious collection of bits of homely and rather coarse-grained humor and anecdote, directed mainly against the clergy; and on his 'Triumph of Venus,' a keen satire on the depravity of his time.

Bec, a celebrated abbey of France, in Normandy, near Brionne, now represented only by some ruins. Lanfranc and Anselm were both connected with this abbey.

Beccafico, bĕk-ă-fĕ'kō, the Italian name of the small olive-brown garden-warbler (*Sylvia hortensis*), called in England "pettychaps," which has the habit of pecking holes in the rind of ripening figs and other fruits, in search of small insects. The damage done is very slight. These birds were eaten with much delight by the ancient Romans, and are still in high favor on Grecian, French, and Italian tables, especially in Venice. An annual feast made on beccaficos is called Beccaficata. The term is also applied in continental Europe, rather indiscriminately, to different kinds of sylvan warblers when fat and in condition for the table.

Beccafumi, Domenico, bĕk-kă-foo'mĕ, dō'mă-nĕ'kō, surnamed MECHERINO, Italian painter: b. near Sienna, 1486; d. Sienna, 1551. As a shepherd boy amusing himself with drawing figures on the sand, he attracted the attention of a wealthy man, from whom he takes the name of Beccafumi, who, discerning his genius, sent him to Sienna to study drawing. He there saw, admired, and tried to imitate the paintings of Perugino, but having heard much of Raphael and Michael Angelo, obtained means from his patron to travel to Rome. After much study of the masterpieces of the Vatican he returned to Sienna and enriched its churches with many noble frescoes and other paintings. He drew and colored well, possessed strong inventive powers, was thoroughly acquainted with perspective, and excelled particularly in foreshortening, but he was not free from mannerism, and his heads are in general deficient in both dignity and beauty. He was buried with pomp in Sienna cathedral, among some of the finest monuments of his genius. His paintings include: 'St. Catherine receiving the Stigmata' (Sienna), 'Madonna and Child' (Berlin), 'Marriage of St. Catherine' (Rome), etc. He also gained distinction as a sculptor and engraver.

Beccarelli, bĕk-kă-rĕl'lĕ. See QUIETISM.

Beccaria, Cesare Bonesana, Marchese di, bĕk-kă-rĕ'a, chă'să'rĕ bō-nă-să'nă, mar-kă'sĕ dĕ, Italian author: b. Milan, 1735 (or 1738); d. November 1794. He was early excited by Montesquieu's 'Persian Letters,' to the cultivation of his philosophical talents, and was afterward favorably known as a philosophical writer by his noble philanthropic 'Crimes and Punishments' (1764), and several other works. With the eloquence of true feeling and a lively imagination he opposes capital punishments and torture. This work led to the establishment of more correct principles of penal law, and contributed to excite a general horror against inhuman punishments. He is also known in Italy as the author of a philosophical grammar and theory of style, 'Ricerche intorno alla Natura dello Stilo' (Milan 1770), and of several good treatises on style, rhetorical orna-

ment, etc., contained in the journal 'Il Caffè,' edited by him in conjunction with his friends, Visconti, Verri, and others. In 1768 a chair of political philosophy was created for him at Milan.

Beccaria, Giovanni Battista, jō-vă'nĕ băt-tĕs'tă, Italian philosopher: b. Mondovì, 1716; d. 27 April 1781. He went to Rome in 1732, where he studied, and afterward taught grammar and rhetoric; at the same time applying himself with success to mathematics. He was appointed professor of philosophy at Palermo, and afterward at Rome. Charles Emanuel, king of Sardinia, invited him to Turin in 1748, to fill the professorship of natural philosophy at the university there. He paid much attention to the subject of electricity, and published 'Natural and Artificial Electricity' (Turin 1735), besides many other valuable works on this subject. In 1759 the king employed him to measure a degree of the meridian in Piedmont.

Becerra, Gasparo, bĕ-thĕr'ra, găs-pă'rō, Spanish artist: b. Baeza, Andalusia, 1520; d. Madrid, 1570. He studied for some time in Rome under Michael Angelo and others, and on his return became sculptor and painter to Philip II. He adorned the palace of Madrid with several frescoes, and also executed works in sculpture and architecture.

Beche, bâsh, Sir Henry de la, English geologist: b. 1796; d. 1855. He founded the geological survey of Great Britain, which was soon undertaken by the government, De la Beche being appointed director-general. He also founded the Jermyn Street Museum of Economic or Practical Geology, and the School of Mines. His principal works are: 'Geology of Jamaica'; 'Classification of European Rocks'; 'Geological Manual'; 'Researches in Theoretical Geology'; 'Geology of Cornwall, Devon, and West Somerset'; etc.

Bêche-de-Mer, bâsh-de-măr, the French name for the dried flesh of holothurians. It is largely cured in the South Sea Islands.

Becher, Johann Joachim, bĕh'ĕr, yō'han yō'a-hĭm, German chemist: b. Speyer, 1635; d. 1682. He traveled and resided in various parts of Germany, Holland, Italy, Sweden, and Great Britain, investigating Cornish and Scotch mines. He wrote a number of works on chemistry, the chief of which is entitled 'Physica Subterranea.' In it he expounds his views on the composition of inorganic bodies, the constituents of which, according to him, are three earthy principles, the vitrifiable, the combustible, and the mercurial. The metals consist of these three earths in different proportions, and whenever a metal is calcined the combustible and mercurial earths are expelled, and the vitrifiable earth forms the residual calx. When these principles are combined with water different salts are formed, and a fundamental acid, which exists in all the others. This theory was subsequently developed by Stahl, who, by means of the principle of phlogiston (q.v.) explained not only the calcination of metals, but the phenomena of combustion in general.

Bechstein, Johann Matthäus, bĕh'stĭn, yō'-hăn mă-tă'oos, German naturalist: b. Waltershausen, Gotha, 1757; d. 1822. He studied theology for four years at Jena, but never felt in his element unless hunting in the fields or roam-

ing the forest. After teaching for some time he resolved to devote himself to his favorite pursuits, and in 1800 the Duke of Saxe-Meiningen made him director of the Forest Academy of Dreissigacker, in the vicinity of his capital. This academy, under Bechstein's management, became one of the most celebrated establishments of the kind in Germany. His chief work is his 'Natural History of Germany,' in four volumes. In Great Britain he is best known by a treatise on singing-birds.

Bechstein, Ludwig, lood'vîh, German poet and novelist: b. 1801; d. 1860. He is chiefly remembered for 'The Legend Treasure and the Legendary Cycles of Thuringia' (1835-8); 'German Fairy-Tale Book' (1845, 41st ed. 1893); and others. Among his epical poems are: 'The Children of Haymon' (1830); 'The Dance of Death' (1831); 'New Natural History of Pet Birds' (1846), a humorous didactic poem; and 'Thuringia's Royal House' (1865). Of his numerous novels, chiefly historical, the best known is 'Journeys of a Musician' (1836-7).

Bechuanaland, bët-choo-a'na-länd, Africa, an extensive British territory in the southern part of the continent, so named from its chief inhabitants, the widely spread race of people called Bechuana. It may be said to extend from the Orange River on the south to the Zambesi on the north, having the German territory on the west and the former South African republic (Transvaal), etc., on the east. The Bechuana belong to the great Kafir race, and are divided into tribal sections, each of which has a chief. Many of them live in villages or towns, some of which are of considerable size. They work with skill in iron, copper, and ivory, and engage in husbandry, cattle-breeding, and hunting. Bechuanaland is a portion of an elevated plateau 4,000 to 5,000 feet above the level of the sea, and though so near the tropics, is suitable for the British race. In winter there are sharp frosts, and snow falls in some years. The rains fall in summer, and then only the rivers are full. It is an excellent country for cattle; sheep thrive in some parts, and there are extensive tracts available for corn lands; but it is not a wheat country on account of the summer rains. Though apparently subject to droughts, it is not more so than Cape Colony, and the greater portion will be available for farming operations when the necessary dams have been constructed. It can be reached from Cape Town, Port Elizabeth, Durban, Delagoa Bay, and the Zambesi, the railway from the former being extended to Kimberley, Vryburg, Mafeking, Palachwe, Tati, and Buluwayo. There are extensive forests to the northeast, and to the west lies the Kalahari desert, which only requires wells dug to make it inhabitable.

The enormous quantities of buck which roam over the land attest the productiveness of the soil. Gold has been found near Sitlagoli, and there are indications of gold-bearing quartz reefs in many directions. Diamondiferous soil is also said to exist in several localities; indeed, diamonds were discovered at Vryburg in the autumn of 1887.

The province of Stellaland is principally inhabited by Boers, and the remainder of the country by Bechuana. The Bechuana are a black race possessing a language in common

with the Bantu races of South Africa, extending as far north as the equator. Their ancestors are said to have come from the north, and progressing southwest, met the Hottentots from the Cape of Good Hope journeying north. The Bechuana have divided up within the last 150 years, and comprise the Bahurutse, Bamangwato, Bakwena, Bangwaketse, Barolong, Batlapin, and Batlaros. Each tribe has an animal as an emblem, or heraldic sign, which it is said they hold in esteem. Since 1832 they have been at enmity with the Matabele, and in later years the Transvaal Boers have on one pretext or another endeavored to occupy their country. During the native risings in 1878 the Bechuana invaded Griqualand West, and were in turn subdued by British volunteers as far as the Molopo. When the British government withdrew from Bechuanaland in 1880, the natives, being helpless, were left to the mercy of the Boers of the Transvaal, whose harsh treatment in 1882 and 1883 led to the Bechuanaland expedition in 1884. At the beginning of the 19th century the Bechuana were further in advance in civilization than other nations of South Africa, and they are still ahead in this respect. The system of government among the Bechuana would be termed in Europe local government. All important matters are decided in the public assembly of the freemen of the town, but matters are previously arranged between the chief and headmen. During the Boer-British war of 1899-1900, Mafeking was the scene of one of the most determined and successful defenses in history. See BADEN-POWELL.

Beck, James Burnie, American lawyer: b. Dumfriesshire, Scotland, 13 Feb. 1822; d. 3 May 1890. He came to the United States when a youth and settled in Kentucky, and was graduated at the law school of Transylvania University in 1846. He practised law in Lexington, Ky., for 20 years. He was elected a Democratic representative to Congress in 1866, 1868, 1870, and 1872; and United States senator in 1876, 1882, and 1888.

Beck, Karl, Austrian poet: b. Baja, Hungary, 1 May 1817; d. Vienna, 10 April 1879. His poems reflect the passionate temperament of his Hungarian countrymen in sonorous verses of consummate finish. Among his works are 'Nights' (1838); 'The Poet Errant' (1838); 'Jankó' (1842), a romance in verse; 'Songs of the Poor Man' (1847); 'Jadwiga' (1863), a tale in verse; 'Mater Dolorosa' (1854), a novel.

Beck, Lewis Caleb, American scientist: b. Schenectady, N. Y., 4 Oct. 1798; d. Albany, N. Y., 20 April 1853. A man of remarkable and wide scientific attainments, he graduated at Union College 1817, and became professor of chemistry and natural history at Rutgers College 1830-37 and 1838-53; professor of chemistry and pharmacy at Albany Medical College 1841-53; and State mineralogist of New York 1837. His publications include 'Gazetteer of Illinois and Missouri' (1823); 'Salt Springs at Salina' (1826); 'Mineralogy of New York' (1842), his most important work; and 'Botany of the United States North of Virginia' (1848). Cf. Gross, 'American Medical Biography.'

Becke, George Louis, Australian author: b. Port Macquarie, New South Wales, 1848. He went to sea at the age of 14 and has spent his life

BECKENHAM — BECKET

trading in the South Pacific. His publications are 'By Reef and Palm' (1894); 'South Sea Stories'; 'The Ebbing of the Tide' (1896); and with W. Jeffery, 'A First-Fleet Family' (1896); 'Pacific Tales' (1897); 'Wild Life in Southern Seas' (1897); 'Ridan the Devil'; 'Tom Wallis' (1900); 'Edward Barry'; 'Tessa, the Trader's Wife'; 'By Rock and Pool'; 'Breackley Black Sheep'; 'York the Adventurer' (1901); 'The Strange Adventure of James Shervinton'; 'The Jalasco Brig' (1902); 'Rodman the Boat Steerer'; 'Naval Pioneers of Australia'; 'Admiral Philip' (1899); 'The Tapir of Banderah' (1901).

Beckenham, England, a town of Kent, situated southeast of London. It is one of the English municipalities which have experimented in "municipal socialism," as it owns its electric lighting plant and public baths, and has charge of the work of a technical institute. Pop. (1901) 26,300.

Becker, August, German poet and novelist: b. 1828, d. 1891. He was the author of 'Young Friedel, the Minstrel' (1854), a lyrical epic, and of the novels 'The Rabbi's Bequest' (1866); 'Proscribed' (1868); 'The Carbuncle' (1870); 'My Sister' (1876), descriptive of the doings of Lola Montez and the events of 1848 in Bavaria; 'Painter Fairbeard' (1878); and 'The Sexton of Horst' (1889).

Becker, Christiane Luise Amalie Neumann, kris-tē-an' loo-ēs' a-ma'le-e noi'man, German actress: b. Krossen, 15 Dec. 1778; d. Weimar, 27 Sept. 1797. She was the daughter of Johann Christian Neumann, the actor. She performed in both tragedy and comedy, and was a friend of Goethe, who, after her death, made her the theme of his elegy, 'Euphrosine.'

Becker, George Ferdinand, American geologist: b. New York, 5 Jan. 1847. He graduated at Harvard University in 1868; was instructor of mining and metallurgy in the University of California in 1875-9; was attached to the United States geological survey since 1879, and special agent of the 10th census, 1879-83. He was appointed a special agent to examine into the mineral resources of the Philippine Islands in 1898. His publications include 'Geology of the Comstock Lode'; 'Statistics and Technology of the Precious Metals' (with S F Emmons); 'Geology of the Quicksilver Deposits of the Pacific Slope'; etc.

Becker, Karl Ferdinand, German philologist: b. Liser, 14 April 1775; d. Offenbach, 5 Sept. 1849. He was the author of 'Ausführliche Deutsche Grammatik'; 'Handbuch der Deutschen Sprache'; etc.

Becker, Karl Ferdinand, German musician: b. Leipzig, 17 July 1804; d. Leipzig, 26 Oct. 1877. He wrote 'Systematisch-chronologische Darstellung der Musikalischen Literatur' (1836-39); 'Die Hausmusik in Deutschland' (1840); etc.

Becker, Karl Friedrich, German historical writer: b. Berlin, 1777; d. Berlin, 15 March 1806. He wrote various popular works on historical topics, the best known being 'The World's History for Children and their Teachers' (1801-5), a truly successful undertaking.

Becker, Nikolaus, German song writer: b. Bonn, 8 Jan. 1809; d. 28 Aug. 1845; known as the author of the Rhine song, 'They Never

Shall Obtain It, the Free, the German Rhine,' which became immensely popular throughout Germany, and provoked Alfred de Musset's 'We Have Had it, Your German Rhine,' and Lamartine's more conciliatory 'Peace-Marseillaise' (1841).

Becker, Oskar, political fanatic: b. Odessa, Russia, 1839, d. Alexandria, Egypt, 1868. In 1861 he attempted, at Baden-Baden, to kill King Wilhelm I. of Prussia, by shooting at him with a pistol at a distance of but three paces. The king fortunately escaped with only a slight wound in the neck. Becker's motive for the act was his belief that the king was unable to unite Germany. Though sentenced to 20 years' imprisonment he was pardoned by the king on condition of living out of Germany ever after.

Becker, Rudolf Zacharias, German author: b. Erfurt, 9 April 1752; d. 28 March 1822. He first became known by an essay on the theme, "Is it useful to deceive the people?" which gained a prize from the Berlin Academy of Sciences in 1799. His theory was that happiness depended on the gratification of an innate desire for improvement. In 1782 he took charge of a school at Dessau and published a journal for youth. A work in two volumes, entitled 'A Little Book of Needful Help; or, Instructive Tales of Joy and Sorrow in the Village of Mildheim,' became such a favorite with the public that over 500,000 copies were soon disposed of. He also produced other works and journals, and the extensive transactions in them led him, in 1797, to set up a publishing and bookselling establishment at Gotha, which is still continued by his son. On 30 Nov. 1811 he was arrested by Davoust on suspicion of conspiring against Napoleon, and was imprisoned at Magdeburg till April 1813. On this imprisonment he wrote a book, which still has a historical value.

Becket, Thomas à, archbishop of Canterbury, the Saxon hero, priest, and martyr of England in the reign of Henry II.: b. London, 1119, or, according to some writers, 21 Dec. 1117; d. Canterbury, 29 Dec. 1170. He was the son of a Saxon and a Syrian lady, whose union was said to have been brought about in the following extraordinary manner: Gilbert, the father of Thomas, having gone to the Holy Land in the second crusade, was made a prisoner, but while in durance a Syrian damsel, becoming enamored of him and being converted by him to Christianity, contrived to effect his liberation, after which, with little chivalry or gratitude, the Saxon crusader returned home as best he might, leaving the lady by the seashore of Tyre. But, with a love and faith stronger than that of the deserted Carthaginian queen, the fair Saracen followed her recreant lover, and, although she knew but two words of any European language, the names of her lover and of the city where he dwelt, by the repetition of those two words, "London" and "Gilbert," and by the display of her tears, her beauty, her jewels, and her gold, she at length made her way to the already famous metropolis, and there, with well-deserved good fortune, found her Gilbert, both free and willing to reward her undoubting trust by taking her to his home and to his heart, all of which is pure romance. Of so strange a union Thomas was said to be the offspring; but, if possible, his

BECKET

own fortunes were stranger yet. He was at first educated by the canons of Merton, and continued his studies in the schools of Oxford, London, and Paris. On the death of his father he was admitted into the family of Theobald, archbishop of Canterbury, and, with his permission, went to the Continent for the purpose of studying the civil and canon law. He attended the lectures of Gratian at Bologna, and of another celebrated professor at Auxerre. Concerning his early life little more is known; but it is recorded that his first appearance at the court of Henry was made in the humblest guise, bearing his fortunes on his back in the shape of a not too sumptuous garb, riding a spavined jade with galled withers and bare ribs, which moved the insolent mirth of the Norman courtiers. He soon, however, obtained high favor with the king, who, it was alleged, was in some sort under obligation to him, as if he, acting as agent for Theobald, had obtained from the Pope letters prohibitory of the crowning of Eustace, the son of Stephen, by which that design was defeated. This service not only raised Becket in the esteem of the archbishop, but in that of King Henry II, and was the foundation of his high fortune. In 1158 he was appointed high-chancellor and preceptor to Prince Henry, and at this time was a complete courtier, conforming in every respect to the humor of the king. He was, in fact, his prime companion, had the same hours of eating and going to bed, held splendid levees, and courted popular applause. In 1159 he made a campaign with the king in Toulouse, having in his own pay 700 knights and 1,200 horsemen; and it is said he advised Henry to seize the person of Louis, king of France, shut up in Toulouse without an army. This counsel, however, so indicative of a Becket's energy, being too bold for the lay counselors of one of the boldest monarchs of the age, was declined. In the next year he visited Paris to treat of an alliance between the eldest daughter of the king of France and Prince Henry, and returned with the young princess to England. He had not enjoyed the chancellorship more than four years when his patron Theobald died, and King Henry was so far mistaken as to raise his favorite to the primacy, on the presumption that he would aid him in those political views, in respect to Church power, which all the sovereigns of the Norman line embraced, and which, in fact, caused a continual struggle till its termination by Henry VIII. It is narrated that when Henry announced his intention of having Becket promoted to the primacy left vacant by the death of Theobald, Becket prophetically remarked: "I am certain that if, by God's disposal, it were to so happen, the love and favor you now bear towards me, would speedily turn into bitterest hatred."

Becket was consecrated archbishop in 1162, and immediately assumed an austerity of conduct which formed a very natural prelude to the course which he was to follow. Pope Alexander III held a general council at Tours in 1163, at which Becket attended and made a formal complaint of the infringements by the laity on the rights and immunities of the Church. On his return to England he began to act in the spirit of this representation, and to prosecute several of the nobility and others holding Church possessions, whom he also proceeded to excommunicate. Henry, an able and

politic monarch, was anxious to recall certain privileges of the clergy, which withdrew them from the jurisdiction of the civil courts; and it was not without a violent struggle, and in the interests of peace, that Becket finally acquiesced. The king soon after summoned a convocation or parliament at Clarendon, to the celebrated "constitutions" of which, although the archbishop swore that he would never assent, he at length yielded, but afterward refused to affix his signature, and by way of penance suspended himself from his archiepiscopal functions till the Pope's absolution could arrive. Finding himself the object of the king's displeasure, he soon after attempted to escape to France; but being intercepted, Henry, in a parliament at Northampton, charged him with a violation of his allegiance, and all his goods were confiscated. A suit was also commenced against him for money lent him during his chancellorship, and for the proceeds of the benefices which he had held vacant while in that capacity. In this desperate situation he with great difficulty and danger made his escape to Flanders, and, proceeding to the Pope at Sens, humbly resigned his archbishopric, which was, however, restored. He then took up his abode at the abbey of Pontigny, in Normandy, whence he issued expostulatory letters to the king and bishops of England, in which he excommunicated all violators of the prerogatives of the Church, and included in the censure the principal officers of the Crown. Henry was so exasperated that he banished all his relations and obliged the Cistercians to send him away from the abbey of Pontigny; from which he removed, on the recommendation of the king of France, to the abbey of Columbe, and spent four years there in exile.

After much negotiation a sort of reconciliation took place in 1170, on the whole to the advantage of Becket, who, being restored to his see with all its former privileges, forthwith prepared to return to his long vacant see. After a triumphant entry into Canterbury the young Prince Henry, crowned during the lifetime of his father, transmitted him an order to restore the suspended and excommunicated prelates, which he refused to do, for the reason that the Pope alone could grant the favor, though the latter had authorized him to inflict the censure on them. The prelates immediately appealed to Henry in Normandy, who in a state of extreme exasperation exclaimed, "What an unhappy prince am I, who have not about me one man of spirit enough to rid me of a single insolent prelate, the perpetual trouble of my life!" These rash and too significant words induced four of the attendant barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to resolve to wipe out the king's reproach. Having laid their plans, they forthwith proceeded to Canterbury, and having formally required the archbishop to restore the suspended prelates, they returned in the evening of the same day (29 Dec. 1170), and, placing soldiers in the courtyard, rushed with their swords drawn into the cathedral, where the archbishop was at vespers, and, advancing toward him, threatened him with death if he still disobeyed the orders of Henry. Becket, without the least token of fear, replied that he was ready to die for the rights of the Church; and magnanimously added, "I charge you in the name of

BECKETT — BECKWITH

the Almighty not to hurt any other person here, for none of them have been concerned in the late transactions." The confederates then strove to drag him out of the church; but not being able to do so on account of his resolute deportment, they killed him on the spot with repeated wounds, all which he endured without a groan.

The perpetrators of the deed repented, one of them, de Tracy, taking a voyage to Rome, and expiating the enormity in the Holy Land. Henry II. did penance at the saint's tomb.

Thus perished Thomas Becket in his 52d year, a martyr to the cause which he espoused, and a man of unquestionable vigor of intellect. He was canonized two years after his death, and miracles abounded at his tomb. In the reign of Henry III. his body was taken up and placed in a magnificent shrine erected by Archbishop Stephen Langton; and of the popularity of the pilgrimages to his tomb the 'Canterbury Tales' of Chaucer will prove an enduring testimony. See 'Life,' by John Morris, and 'Thomas Becket,' by R. A. Thompson

Beckett, Arthur William, à, English journalist and novelist (son of Gilbert Abbot à Beckett, q.v.): b. Fulham, 25 Oct. 1844. Beside fulfilling other journalistic engagements he was on the staff of 'Punch' 1874-1902, edited the *Sunday Times* 1891-5, and the 'Naval and Military Magazine' 1896. In addition to several comedies he has published 'Comic Guide to the Royal Academy,' with his brother Gilbert (1863-4); 'Fallen Amongst Thieves' (1869); 'Our Holiday in the Highlands' (1874); 'The Shadow Witness' and 'The Doom of St. Quirec,' with Burnand (1875-6); 'The Ghost of Grimstone Grange' (1877); 'The Mystery of Mostyn Manor' (1878); 'Traded Out'; 'Hard Luck'; 'Stone Broke'; 'Papers from Pump Handle Court, by a Briefless Barrister' (1884); 'Modern Arabian Nights' (1885); 'The Member for Wrotenborough' (1895); 'Greenroom Recollections' (1896); 'The Modern Adam' (1899); 'London at the End of the Century' (1900).

Beckford, William, English writer, famous in his time for his immense wealth, eccentricities, and literary talents: b. London, 1761; d. Bath, 2 May 1844. When only 10 years old he was in receipt of an income, through the death of his father, of more than \$500,000 a year. Under the direction of Lord Chatham he received a careful education, and at an early age gave evidence of unusual abilities. His first work, a satirical essay entitled, 'Biographical Memoirs of Extraordinary Painters,' in which he ridiculed the English artists of his time, was published before he was 20 years of age. After this he spent some time in traveling on the Continent, an account of which he published half a century later with the title, 'Italy, with Sketches of Spain and Portugal' (Lond., 2 vols. 1834). On his return to England he entered the House of Commons for a short time as member for Hindon, but soon became tired of this career, and withdrew to Portugal, where he bought an estate in the neighborhood of Cintra, and lived in familiar intercourse with the royal family of Portugal. After the lapse of some years he appeared again in England, and began in 1796 to erect a splendid edifice upon his estate of Fonthill, which he furnished with more than royal luxury, and continually en-

larged with new buildings. Here he resided till 1822, when, owing to the loss of two large estates, which had been successfully claimed in Chancery by other owners, he was obliged to sell Fonthill for £330,000. He then settled at Bath, where he began to occupy himself anew with building and collecting works of art. His literary fame rests upon his eastern tale 'Vathek,' which he wrote in French, and published at Lausanne in 1784, and which made a remarkable impression upon Byron.

Beckham, John Crepps Wickliffe, American statesman: b. Bardstown, Ky., 1867. In 1893 he began the practice of law; elected to the Kentucky legislature 1894-7; speaker 1898; elected lieutenant-governor 1899, and became governor upon the death of Goebel, 3 Feb. 1900; elected governor on the Democratic ticket in the fall of the same year.

Beckmann, Johann, German writer on agriculture and natural history: b. Hoya, Hanover, 4 June 1739; d. Göttingen, 4 Feb. 1811. He studied theology at Göttingen, but soon applied himself to natural philosophy and chemistry. For a short time he was professor of natural philosophy and history at a gymnasium in St. Petersburg. He resigned this, and coming back through Sweden, made the acquaintance of Linnæus and was allowed to see how the Swedish mines were worked. Having returned to Göttingen, he was made professor of philosophy there in 1766, and in 1770 ordinary professor of economy, which office he held for over 40 years. He published several scientific works, which once were popular, but the best known of his productions is called 'Contributions to the History of Discovery and Inventions,' of which several translations have been published in England, where (with corrections and additions extending it to the present time) it continues to be a favorite work.

Beckwith, Sir George, English military officer: b. 1753; d. London, 20 March 1823. His scene of action was largely in America—in the United States and the West Indies. He fought with the English in the American Revolution in 1776-82, and was entrusted with important diplomatic commissions in 1782-91, as there was then no British minister to the United States. In 1804 he was made governor of St. Vincent, and four years later governor of Barbados. As England was then at war with France he organized an expedition and conquered Martinique, for which he obtained the thanks of the House of Commons. Later (1810) he conquered Guadeloupe, the last possession of the French in that part of the world. When he returned to England, after nine years' service in the West Indies, a set of silver plate was given to him by the legislature of Barbados, and the king conferred upon him armorial distinction.

Beckwith, James Carroll, American genre painter: b. Hannibal, Mo., 23 Sept. 1852. He was a pupil of Carolus Duran, in Paris, and became a member of the National Academy in 1894. Among his paintings are 'Under the Lilacs' and 'The Falconer.'

Beckwith, John Watrus, American Episcopal bishop: b. Raleigh, N. C., 9 Feb. 1831; d. 24 Nov. 1890. He was graduated at Trinity College, Hartford, in 1852; ordained priest in 1855; labored in Mississippi and Alabama till

after the close of the Civil War; was then called to the rectorship of Trinity Church, New Orleans; and while there was elected bishop of Georgia, being consecrated in Savannah, 2 April 1868. He was an eloquent preacher, and published several sermons and addresses.

Beckx, Pierre Jean, bĕks, pĕ-ār zhŏn, French general of the order of Jesuits: b. near Louvain, Belgium, 8 Feb. 1795; d. Rome, 4 March 1887. The success of the Jesuits, especially in non-Catholic countries, was greatly due to his tact and energy.

Becky Sharp, the heroine in Thackeray's 'Vanity Fair.' She has been accepted as the type of the shrewd, conscienceless adventuress whose sole purpose is to rise in the world and who allows nothing to interfere with it.

Becque, Henri François, bĕk, òn-rĕ fran-swa, French dramatist. b. Paris, 9 April 1837. He was the pioneer of realism on the Parisian stage, producing 'The Prodigal Son' (1868); 'The Abduction' (1871); 'The Ravens' (1882); 'The Parisian' (1885); etc.

Becquer, Gustavo Adolfo, bĕk-kār', goos-ta'vŏ a-dŏl'fŏ, Spanish poet and novelist: b. Seville, 17 Feb. 1836; d. Madrid, 22 Dec. 1870. His lyrics, chiefly elegiac, show much feeling, and his tales and legends are among the best creations of modern Spanish prose.

Becquerel, Alexandre Edmond, bĕk-rĕl, à-lĕx-andr àd-mŏn, French physicist: b. Paris (son of Antoine César Becquerel, q.v.), 24 March 1820; d. Paris, 13 May 1891. He was decorated with the cross of the Legion of Honor in 1851, and was appointed professor of physics in the Conservatoire des Arts et Métiers in 1853. Besides his conjoint labors with his father he made important researches on the nature of light and its chemical effects, on phosphorescence, and on the conductivity and magnetic properties of many substances. He wrote 'Light, Its Causes and Effects' (1868).

Becquerel, Antoine César, an-twan sâ-zar, French physician, and member of the Institute: b. Chatillon-sur-Loing, 7 March 1788, d. Paris, 18 Jan. 1878. In early life he served in the French army in Spain as an officer of engineers. In 1815 he resigned his commission as *chef de bataillon* of the engineers and devoted himself to scientific pursuits. In 1829 he became professor of physics in the Museum of Natural History. He was a voluminous writer on chemistry and electricity, and his industry in the collecting of facts was remarkable. His principal works are: 'Traité d'Electro-Chimie'; 'Traité de Physique Appliquée à la Chimie et aux Sciences Naturelles'; 'Eléments de Physique Terrestre et de Météorologie' (1847); and 'Traité de l'Electricité et du Magnétisme' (1855). He invented a new psychometer in 1866.

Becquerel, Antoine Henri, òn-rĕ, French physicist. b. Paris, 15 Dec 1852 (son of Alexandre Edmond, and grandson of Antoine César Becquerel, q.v.). In 1892 he became professor of physics in the Natural History Museum, and in 1895 held a similar position at the Polytechnic School. His investigations have largely dealt with such subjects as the magnetic rotation of polarized light, phosphorescence, the ultra-red rays, light-absorption, etc. He is perhaps best known in recent years by his researches concerning the invisible rays given off by uranium,

radium, thorium, etc., called, in his honor, Becquerel rays—a mixture of Roentgen and cathode rays.

Becse, bĕch'ĕ, Hungary, the name of two towns situated on the river Theiss. OLD BECSE is on the right bank, 48 miles south of Szegedin. Pop. (1901) 18,865. NEW BECSE is on the left bank, five miles east of Old Becse. Pop. (1901) 7,752. Both towns carry on an extensive trade in grain.

Bed, in modern domestic use, a framework (bedstead) supporting a mattress or cushion, with coverings, on which to take repose or sleep. Originally a bed consisted merely of a lair or hollowed-out place in the earth, such as is made by a wild animal; then the skins of beasts were employed to render the spot more comfortable, and such skins form the beds of many savage tribes of the present day. Rushes, leaves, husks, twigs, and straw came in time to supplement or replace the skins, and when the Romans invaded Britain they taught the natives to sew their straw within sacks. In the progress of luxury feathers came to take the place of the harder straw, and their use was made the basis of charges of effeminacy against the Roman patricians. The feather bed still persists among the older nations of Europe, but as feathers are bad conductors of caloric they do not permit that free radiation of heat from the body which is essential to comfort and health, and the hair mattress has very largely supplanted it. The feather bed was particularly unserviceable in cases of sickness, as it did not permit of the patient's easily changing his position. Modern mattresses are sometimes made of felt, of pure hair, or of layers of hair and cotton, stuffed more or less tightly into a casing of strongly woven material called ticking. Pillows are made of materials similar to those of the mattress, and the bed-coverings of almost any fabric suited to the taste and purse of the owner, from coarse cotton sheets or blankets to the finest wool or silk. In the northern countries of Europe the downy feathers of the eider duck are largely used for bed-coverings, their slow radiation of heat, mentioned above, permitting the retention of the bodily heat combined with extreme lightness.

Bedsteads have for thousands of years ranged from a mere platform, designed merely to keep the bedding off the floor, to enormous structures of solid costly woods or ivory, magnificently decorated with carvings, or inlaid with precious metals and gems. They were frequently surmounted by canopies, and surrounded with curtains to keep off drafts, or with nettings to exclude flying insects. The bedding was supported within the framework on a network of cord, which later was supplanted by cross-bars or slats of wood. Sometimes bedsteads were built with such lofty platforms that a short stepladder was necessary for ingress and egress. The four-post bedstead held its own for centuries, but within the last 50 years their close curtains, valances, and canopies have given way before the more hygienic iron or brass bedstead, almost entirely free from draperies and fitted with metallic springs or woven-wire mattresses, some of the latter being so elastic, though firm, and giving such general support to the body, as to render thick mattresses almost unnecessary. Wooden bedsteads

BED-SORE — BEDBUG

are still in considerable use, however; but they are mostly free from the objectionable features of the four-post bed.

Folding-beds have had considerable vogue for a long period, being designed for economy of space in small rooms. Truckle or trundle beds, were formerly used for similar economic reasons, and consisted of a low platform on wheels to admit of its being run under the larger bed by day, and was occupied at night by children or servants. Other forms of space-saving beds are folding cots, and lounges constructed over a box-body wherein the bedding may be concealed by day.

Special forms of bed have been contrived for the benefit of sick and wounded persons, notably mattresses of material impervious to air or water and filled with those fluids.

In *French history*, the bed of justice was the throne on which, before the Revolution of 1789, the king used to sit when he went to Parliament to look after the affairs of State, the officers of Parliament attending him in scarlet robes. As this interference of the king with the Parliament was not compatible with free government, sitting on the bed of justice came to signify the exertion of arbitrary power.

In *law*, a divorce from bed and board is the divorce of a husband and wife to the extent of separating them for a time, the wife receiving support, under the name of alimony, during the severance.

In *mechanics*, a bed is the foundation piece or portion of anything on which the body of it rests, as the bed-piece of a steam engine; the lower stone of a grinding-mill; or the box, body, or receptacle of a vehicle.

Bed-sore, an ulcer due to long-continued pressure on certain bony prominences of the body, due to protracted maintenance of the reclining position. The buttocks, shoulder-blades, and heels are the most frequently affected sites. In certain diseases, notably in myelitis, or inflammation of the spinal cord, bed-sores may develop very rapidly, within ten days to two weeks. Here the nerve-fibres governing the tone of the skin are affected. In long-continued diseases, however, necessitating the reclining posture, bed-sores develop largely from lack of careful nursing. A due amount of attention paid to absolute cleanliness, care for the skin, careful turning, and use of air-cushions or the water-bed, are often effective in preventing them. Alcohol and water, equal parts, is one of the best washes. If ulcers develop in spite of all precautions, they should be surgically treated. Oxid of zinc ointment, balsam of Peru, aristol powder, or bismuth powder, may all be used, alone or in combination.

Bed of Justice (Fr. *lit de justice*), formerly a solemn ceremony in France, in which the king, with the princes of the blood royal, the peers, and the officers of the crown, state, and court, proceeded to the Parliament, and there, sitting upon the throne (which in the old French language was called *lit*, because it consisted of an under cushion, a cushion for the back, and two under the elbows), caused those commands and orders which the Parliament did not approve to be registered in his presence. The Parliament had the right of remonstrating in behalf of the nation against the royal commands and edicts. If the king, however, did not

choose to recede from his measures, he first issued a written command (*lettres de jussion*) to the Parliament, and if this was not obeyed he held the *lit de justice*. The Parliament was then, indeed, obliged to submit, but it afterward commonly made a protest against the proceeding. Louis XV. held such a *lit de justice* in 1763, in order to introduce certain imposts, but on account of the firm resistance of the parliaments was finally obliged to yield. The last *lits de justice* were held by Louis XVI. at Versailles, 6 Aug. 1787.

Bedamar, bā-da-mar', a character (a Spaniard of noble birth) in Saint Real's 'Conjuración des Espagnols contre la République de Venise,' the source of Otway's 'Venice Preserved.'

Bédarieux, bā-da-rē-ur, France, a town in the department of Hérault, on the left bank of the Orb, 18 miles north from Beziers. It is well built, and is one of the busiest and most thriving commercial and manufacturing towns of the same size in France. It has manufactures of fine and common cloth, woolen stuffs, floss silk, worsted and cotton stockings, hats, soap, olive-oil; tanneries, dye-works, paper and glass works, and a brass foundry. It has also a trade in wine and brandy. Pop. (1901) 5,802.

Bedbug, a hemipterous insect (*Cimex* or *Acanthias lectularius*). The body is broad, two and a half lines in length, flat and wingless; it is a rust red color with fine brown hairs. By its shape it is adapted for living in cracks between boards in furniture, etc., and by its long, slender beak it sucks the blood of its victim. This insect lays eggs throughout the warmer months of the year, the generations succeeding each other as long as the temperature is high enough. The eggs are oval, white, and the young bugs hatch in about eight days, escaping by pushing off a lid at one end of the shell. They are white, transparent, differing from the perfect insect in having a broad, triangular head, and short and thick antennæ. The bedbug is said to live as a parasite on domestic birds, such as the dove. A nest of swallows swarming with alleged bedbugs was once found on a courthouse in Iowa. Trestwood states that the bedbug is 11 weeks in attaining its full size; it molts about five times. De Geer has kept full-sized individuals in a sealed bottle for more than a year without food. The cockroach is the natural enemy of the bedbug and destroys large numbers, as does also the *Reduvius* and certain kinds of ants. In Europe a small black ant, *Monomorium*, is said to clear a house of them in a few days. Houses have been cleaned of them after being thoroughly fumigated with brimstone, or by the use of insect powder blown into the cracks and crevices where they live. They are also easily destroyed by painting the cracks with corrosive sublimate dissolved in alcohol. Temporary relief may be had by sprinkling insect powder over the sheets of the bed one is to occupy. As the bedbug was known to Aristotle, who supposed it arose spontaneously from sweat, it is probable that it originated about the Mediterranean Sea, for it was not known to have occurred in England before the 17th century.

Bibliography — Osborn, 'Insects Affecting Domestic Animals' (Dept. of Agriculture Bulletin); Sutherland, H., 'The Book of Bugs.'

BEDDOES—BEDE

Beddoes, Thomas, English physician and author: b. Shifnal, Shropshire, 1760; d. 1808. He distinguished himself both at school and at Oxford by his knowledge of ancient and modern languages and literature. The great discoveries in physics, chemistry, and physiology irresistibly attracted him. He continued his studies with success in London and Edinburgh. In his 26th year he took his doctor's degree, afterward visited Paris, and formed an acquaintance with Lavoisier. On his return he was appointed professor of chemistry at Oxford. There he published some excellent chemical treatises, and observations on the calculus, scurvy, consumption, catarrh, and fever. Dazzled by the splendid promises of the French Revolution, he offended some of his former admirers, and excited such a clamor against him by the publication of his political opinions that he resigned his professorship and retired to the house of a friend, Mr. Reynolds, in Shropshire. There he composed his 'Observations on the Nature of Demonstrative Evidence,' in which he endeavored to prove that mathematical reasoning proceeds on the evidence of the senses, and that geometry is founded on experiment. He also published the 'History of Isaac Jenkins,' which was intended to impress useful moral lessons on the laboring classes in an attractive manner. Above 40,000 copies of this popular work were sold in a short time. After his marriage in 1794 he formed the plan of a pneumatic institution for curing diseases, particularly consumption, by means of factitious airs or gases. With the assistance of the celebrated Josiah Wedgwood, he succeeded in opening this institution in 1798. As superintendent of the whole, he engaged young Humphry Davy, the foundation of whose future fame was laid here. The chief purpose of the institution, however, was never realized, and Beddoes' zeal gradually relaxed, so that he relinquished it a year before his death, after having published a number of valuable works upon the application of factitious airs. In the last years of his life he acquired the reputation of the best medical writer in Great Britain, particularly by his 'Hygeia,' in three volumes, a popular work which contains passages of extraordinary eloquence. His political pamphlets from 1795-7 are forgotten.

Beddoes, Thomas Lovell, English dramatist and physiologist: b. Clifton, 20 July 1803; d. Basel, 26 Jan. 1849. He published 'The Bride's Tragedy' while an undergraduate at Oxford, and led an eccentric life, ultimately committing suicide. His work was largely fragmentary, but his posthumous 'Death's Jest-Book; or, the Fool's Tragedy' (1850) received the high praise of such judges as Landor and Browning. It was begun in 1825, and occupied him till his death, being mostly written while he was studying medicine in Germany. In 1890 Mr. Gosse edited an edition of his poetical works in two volumes, with a memoir, and in 1894 the same editor produced a volume of his letters.

Bede, bēd, or Bæda, bēda, eminent English ecclesiastic, usually called the VENERABLE BEDE: b. near Wearmouth, Durham, 672 or 673; d. May 735. From the age of 7 to that of 19 he pursued his studies in the monastery of St. Peter, at Wearmouth. Being then ordained deacon, he was employed in the task

of educating the youth who resorted to the monastery for instruction, and pursued his own studies with unremitting ardor. In his 30th year he was ordained priest; and his fame for zeal and erudition reaching the ears of Pope Sergius, he was invited to Rome, but in consequence of the death of that pontiff never went there. It is not even certain that he ever left Northumberland, which of course reduces the incidents of his life to his literary pursuits and domestic occupations, as he accepted no benefice and never seems to have interfered in civil transactions. The Church history was completed in 731. His last literary labor was a translation of the Gospel of St. John into Saxon, which he completed with difficulty, on the very day and hour of his death. The manner of the death of this virtuous ecclesiastic was striking and characteristic. He was dictating his translation of the Gospel of St. John to an amanuensis. The young man who wrote for him said, "There is now, master, but one sentence wanting," upon which he bade him write quickly; and when the scribe said, "It is now done," the dying sage ejaculated, "It is now done," and a few minutes afterward expired in the act of prayer on the floor of his cell.

The writings of Bede were numerous and important, considering the time in which they were written and the subjects of which they treat, which extended to ecclesiastical affairs, religion, and education. His 'Ecclesiastical History of England' is the greatest and most popular of his works, and has acquired additional celebrity by the translation of King Alfred. The collections which he made for it were the labor of many years. Besides his own personal investigations he kept up a correspondence with the monasteries throughout the heptarchy, to obtain archives and records for his purpose; and thus nearly all the knowledge possessed of the early state of Christianity in his country is due to Bede. There have been several editions of the original Latin, which is easy, although not elegant. Probably the best editions are those of Dr. Smith (Cambridge 1722), Stevenson (London 1838), Dr. Hussey (Oxford 1846), and that in Giles' complete edition of his works (with translation, London 12 vols. 1843-4). The earliest translation of the history into modern English is that of Thomas Stapylton (Antwerp 1565). Bede was also the author of many works, a catalogue of which he subjoined to his history. Several of these were printed early; but the first general collection of his works was that of Paris, 1544-5, 6 vols. folio. Another edition in six volumes was published at the same place in 1554, and others were subsequently published at Basel and Cologne. While the number and variety of the writings of Bede show the extent of his erudition, his probity, moderation, and modesty ensured him general respect; and his disinterestedness is proven by the fact that he was never anything but an unbeneficed priest. A letter of advice which he wrote late in life to Egbert, archbishop of York, proves at once the purity of his morals, the liberality of his sentiments, and the excellence of his discernment; his wish being to promote morality and religion and especially to increase the efficiency of the secular clergy.

Bede, Adam, a character in the novel of the same name, by George Eliot, said to be in part a portrait of the author's father. He is a

carpenter with some knowledge of books. He loves Hetty Sorel, but marries Dinah Morris (q.v.).

Bedeau, bē-dō, Marie Alphonse, French general: b. Vertou, near Nantes, 1804; d. Nantes, 1863. He won his military fame in Algeria, where he was active in the operations against the Algerians and became general of brigade. He was in Paris at the outbreak of the revolution of 1848, and was subsequently vice-president of the constituent assembly. As he opposed Louis Napoleon, he went into exile after the *coup d'état* of December 1851.

Bedeguar, bēd'e-gār, or Sweetbriar Sponge, a mossy roundish gall somewhat resembling a chestnut burr in size and form, but generally more or less reddish or purplish. It is caused by a poisonous fluid injected into the plant by a gall-fly (*Rhodites rosæ*), the larvæ of which may be found feeding upon the plant juices. Like many other vegetable substances, it was believed to be useful in medicine in cases of sleeplessness, diarrhœa, scurvy, stone, worms, etc.

Bedel, bē-dēl', Timothy, American army officer: b. Salem, N. H., about 1740; d. 1787. In the Revolutionary War he was in command of the American force near Montreal, which surrendered without resistance when attacked by Brant's Indians. He was sick at the time, and the surrender was made by the officer second in command, yet Arnold placed the blame on Bedel.

Bedell, bē-dēl', Frederick, American physicist: b. Brooklyn, N. Y., 12 April 1868. He graduated at Yale in 1890, and at Cornell in 1892, and was assistant professor of physics at the last named, 1892-1900. He has established a high reputation for his investigations in alternating currents of electricity. Publications: 'Principles of the Transformer' (1896); with A. C. Crehore, 'Alternating Currents' (4th ed. 1901); and numerous special articles in the 'Sibley Journal' and 'Physical Review.'

Bedell, Gregory Thurston, American clergyman: b. Hudson, N. Y., 27 Aug. 1817; d. 11 March 1892. In early life he was rector of the Protestant Episcopal Church of the Ascension, New York. In 1859 he was consecrated assistant bishop of Ohio, and in 1873 bishop of that State. He wrote 'The Divinity of Christ'; 'The Profit of Godliness'; 'The Age of Indifference'; 'Episcopacy—Fact and Law'; 'A Canterbury Pilgrimage'; 'A Votive Pillar'; 'Memorial of Bishop McIlvaine'; and 'Pastoral Theology.'

Bedell, William, English clergyman: b. Black Notley, Essex, 1570; d. 1642. He studied at Cambridge, became minister of St. Edmundsbury in Suffolk, and in 1604 went to Venice as chaplain to the ambassador, Sir Henry Wotton. Here he remained for eight years and became intimately acquainted with the celebrated Fra Paolo Sarpi, who taught him Italian and was taught theology in return. While here Bedell translated the English prayer-book into Italian. On his return to England he resumed the duties of his curacy, but left it in 1615 for the living of Horingsheath. Here he remained for 12 years, and quitted it to become provost of Trinity College, Dublin. He undertook several important reforms, and successfully accomplished them through the admirable man-

ner in which he tempered firmness with prudence. In 1629 he was appointed to the united sees of Kilmore and Ardagh, but thinking the duties of one sufficient, he retained only Kilmore and insisted on resigning Ardagh. He next turned his attention to the Roman Catholics, and labored assiduously to convert them to Protestantism. He caused the prayer-book to be translated into Irish and read regularly every Sunday in the cathedral. The New Testament had already been translated, but Bedell had the honor of perfecting the boon by procuring the translation of the Old Testament. In 1641, on the breaking out of the rebellion, his house was for some time the only English one in the county of Cavan which remained uninjured; but at last he was so far involved in the common fate that he was carried off to the castle of Cloughboughter, where he was imprisoned with many others, the only exception in his favor being that he was not put in irons. His works are few and of comparatively little importance. His biography has been written by Bishop Burnet.

Beden, the Arabic name, in Palestine, of the local species of ibex (*Capra sinatica*), which ranges throughout Palestine and along both shores of the Red Sea. It varies little from other ibexes except in having the great horns of the bucks more compressed, and the knobs on their front at less regular intervals. The general color is yellowish, with conspicuous dark markings on the front of the fore legs, chest, and back. See IBEX.

Bedesman (Saxon, *bead*, a prayer), was a common suffix to the signature at the end of English letters in the 15th and 16th centuries, and equivalent to petitioner. The Pasten letters, 1460-80, furnish many examples. Sir Thomas More, writing to Cardinal Wolsey, styles himself "Your humble orator and most bounden bedesman." Margaret Bryan, the governess of Princess Elizabeth, signs herself, in writing to a superior, "Your daily bede-woman."

Bedford, Gunning, American patriot: b. Philadelphia, Pa., about 1730; d. Sept. 1797. He was a lieutenant in the French war; entered the Revolutionary army with the rank of major; was wounded at White Plains; became muster-master-general in 1776; was a delegate to the Continental Congress; and was elected governor of Delaware in 1796.

Bedford, Gunning, American lawyer: b. Philadelphia, Pa., 1747; d. 30 March 1812. He was graduated at Princeton in 1771; became a lawyer; acted for a time as aide-de-camp to Gen. Washington; represented Delaware in the Continental Congress in 1783-6; and became attorney-general of the State, and United States judge for the district of Delaware.

Bedford, Gunning S., American physician: b. Baltimore, Md., 1806; d. New York, 5 Sept. 1870. He was graduated at Mount St. Mary's, Emmitsburg, Md., 1825; took his medical degree in Rutgers Medical College, 1829; and spent some years in special study in Europe. In 1833 he was appointed professor in the medical college at Charleston, S. C.; subsequently was called to the Medical College, Albany, N. Y.; and in 1836 settled in New York. He made a specialty of obstetrics; was one of the projectors of the University Medical College; and introduced into the United States obstetrical

BEDFORD — BEDFORD MISSAL

clinics for the gratuitous treatment of poor women. His principal publications, 'Diseases of Women and Children' and 'Principles and Practice of Obstetrics,' have had a large circulation in the United States and Europe.

Bedford, Jessie (ELIZABETH GODFREY), English novelist: b. Hampshire, England. Under the pen name of ELIZABETH GODFREY she has published in America several musical novels which have been popular. Her most important works are: 'The Harp of Life'; 'Poor Human Nature'; 'The Winding Road' (1902)

Bedford, John Plantagenet (DUKE OF), regent of France, third son of Henry IV. of England: b. 20 June 1389; d. 1435 Shakespeare, who calls him Prince John of Lancaster, introduces him in his plays of Henry IV. as distinguishing himself by his youthful courage in the battle of Shrewsbury in 1403, and forming a kind of moral contrast to his more dissipated brother, the Prince of Wales. During the reign of Henry V. he participated in the fame acquired by the conquest of France; but his talents were fully displayed when, after the death of that king, he became regent of France, having been appointed to this post by Henry in his will. At Verneuil, in 1424, he displayed his military talents; and the difficulties which he experienced in endeavoring to maintain possession of the conquered provinces in France afforded frequent occasion for the manifestation of his ability. The greatest blemish in his character is his cruel execution of the Maid of Orleans in 1431. He survived this event about four years, and dying at Rouen, was buried in the cathedral of that city.

Bedford, John Russell (DUKE OF), English nobleman: b. 1766; d. 1839. He was versed in literature, fond of science, and a passionate lover of agriculture, to the improvement of which he devoted years of his life and the expenditure of vast sums of money. He was the father of the celebrated statesman, Lord John Russell (q.v.).

Bedford, England, a parliamentary and municipal borough, situated on the Ouse, county town of Bedfordshire. The chief buildings are the law courts, a range of public schools, a large infirmary, county jail, etc., and several churches. The town is rich in charities and educational institutions, the most prominent being the Bedford Charity, embracing grammar and other schools, and richly endowed. There is an extensive manufactory of agricultural implements; lace is also made, and there is a good trade. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned.

Bedford, Ind., a city and county-seat of Lawrence County, 65 miles southwest of Indianapolis on the Baltimore & O. S. W. and other R.R.'s. It has 24 large quarries of building-stone, the working of which is the chief industry, but there are also railroad shops, veneering-mills, etc. The court-house and other public buildings are fine stone edifices. Pop. (1900) 6,115.

Bedford, Nova Scotia, a village of Halifax County, situated on the Intercolonial R.R., north of the city of Halifax. Its site is very picturesque, and it is a favorite summer resort. Pop. about 1,500.

Bedford, Pa., the county-seat of Bedford County, situated on a branch of the Juniata River, and on the Pennsylvania R.R., Bedford division, 94 miles southwest of Harrisburg. It is a place of considerable historic interest, as it was for some time an important military post, was once Washington's headquarters, and in 1794 the headquarters of the troops sent to suppress the Whiskey Rebellion. Bedford Springs, a favorite summer resort, is located about a mile from Bedford. The chief industry is the mining and manufacture of iron. Pop. (1900) 2,167.

Bedford, Quebec, a town in Missisquoi County, situated near the northern end of Lake Champlain, on the Canadian P. R. R. Its chief manufactures are knitting-needles, gloves, and farming implements. Pop. (1901) 1,364.

Bedford City, Va., a town and county-seat of Bedford County, on the Norfolk & W. R.R. It has a picturesque situation at the base of the Blue Ridge Mountains, with an elevation of over 1,000 feet. It is the seat of the Randolph Macon Academy (Methodist Episcopal), of the Belmont Seminary (Presbyterian), of the St. John's Institute for Girls (Episcopal), and of the Jeter Female Institute (Baptist). It is in a tobacco-growing region, is the centre of the trade for its district, and has a number of tobacco factories, as well as several other industries, including a woolen-mill, flouring-mills, and foundry. Pop. (1900) 2,416.

Bedford Level, England, a large tract of low-lying land, comprising about 400,000 acres in Cambridge, Norfolk, Suffolk, Huntingdon, Northampton, and Lincoln counties, formerly full of fens and marshes, and in rainy seasons for the most part under water. Peterborough Fen, which is that part of the level running into Northamptonshire, and extending between Peterborough and Crowland, contains between 6,000 and 7,000 acres. One seventh part of the level is situated in Huntingdonshire. Nearly the whole of the Isle of Ely, which forms the northern division of Cambridgeshire, consists of this marshy ground. The southeastern part of Lincolnshire, usually termed Holland, extending to the river Witham on the north, is also included in the Bedford Level. About 63,000 acres are situated in Norfolk, and 30,000 in Suffolk. It derives its name from Francis, Earl of Bedford, who in the 17th century expended large sums of money in attempting to drain the district. Numerous cuts have been made, intersecting every part, some so large and deep as to serve as navigable canals. In the Isle of Ely two of these cuts, the Old and New Bedford rivers, running nearly parallel to each other, are navigable for over 20 miles. Wind-mills and steam-engines raise the water to such a height as to admit of its being carried off to its proper channel; but the expense has sometimes greatly exceeded the value of the land reclaimed; and the great cuts and embankments constructed in recent times have rendered the drainage now tolerably effective. A great part of the level is under cultivation, and produces grain and some other crops in considerable quantities; but there is still enough fen to form shelter for vast numbers of wild fowl.

Bedford Missal, a book made for John Plantagenet, Duke of Bedford (q.v.) and his duchess. This rich volume is 11 inches long,

BEDIVERE — BEDSTRAW

7½ broad, and 2½ thick, bound in crimson velvet, with gold clasps, on which are engraved the arms of Harley, Cavendish, and Hollis, quarterly. It is embellished with 59 large miniature paintings, with over 1,000 of a small size; and among them are to be seen several portraits of persons of eminence. It was purchased by Edward Harley, Earl of Oxford, from Lady Worsley, great-granddaughter to W. Seymour, second Duke of Somerset, who figured in the reign of Charles I.; and descended from Lord Oxford to his daughter, the Duchess of Portland. In the year 1786, when the collection of the duchess was brought to sale, it was purchased by a Mr. Edwards for \$1,100, and was sold again at the sale of the collection of that gentleman, in the year 1815, when it brought \$3,350, and came into the possession of the Duke of Marlborough. On coming to the hammer once more it strongly attracted the attention of book-collectors and antiquaries, and realized the unprecedented sum of \$5,350, being sold at that price (June 1833) to Sir John Tobin of Liverpool. It is now lodged in the collection of the British Museum. In a historical point of view it is interesting on account of its pictorial embellishments, some of which have been engraved by Virtue for his portraits to illustrate the 'History of England.' For the antiquarian and the student of the fine arts it is one of the most interesting monuments of that age. The antiquarian Gough published a work describing the Bedford Missal. Dibdin, in his 'Bibliomania,' gives an account of it.

Bedivere, béd'ī-vēr, Sir, in Arthurian legend, one of King Arthur's most trusted knights. It was Sir Bedivere who cast the sword Excalibur into the lake and carried the dying Arthur to the vessel in which he was borne away to Avalon.

Bedlam, a corruption of Bethlehem, the name of a religious foundation granted in 1547 by Henry VIII. to the corporation of London, and by them applied to the purpose of a hospital for the insane. The place was originally within the city boundaries, but in 1814 a new building was erected in St. George's fields, on the south side of the Thames, which was called New Bethlehem, or vulgarly, Bedlam. The patients, who had been discharged partially cured, and went about begging, were called Bedlam beggars, or Tom-o'-Bedlams.

Bed'lington, a coal-mining town of England on the river Blyth in Northumberland, 11 miles north of Newcastle. Pop. (1901) 18,750.

Bedlington Terriers. See TERRIER.

Bedloe's, or **Liberty Island**, an island in New York harbor; ceded to the United States government, in 1800; the site of Fort Wood, erected in 1841 and mounted with 77 guns. It is now the location of Bartholdi's colossal statue of 'Liberty Enlightening the World,' presented by France to the United States. See LIBERTY, STATUE OF.

Bedmar', Alphonso de la Cueva (MARQUIS DE), Spanish politician and cardinal: b 1572; d. Oviedo, 1655. He was sent in 1607 by Philip III. as ambassador to Venice, and rendered himself famous by the conspiracy against Venice which St. Real has so well described. Notwithstanding the circumstantiality with which the details are given by St. Real, the very

existence of the conspiracy is still considered by many a very difficult historical problem. The probability is that the conspiracy was real, but that the Senate, satisfied with having discovered it, and not willing to break altogether with Spain, did not think it advisable to give it much publicity. It forms the subject of Otway's tragedy, 'Venice Preserved.' Bedmar was obliged to save himself by flight to avoid the fury of the populace, but he did not lose the favor either of his own sovereign or of the Pope. By the former he was appointed governor of the Low Countries, where his severity and rigor made him universally detested; and from the latter he received a cardinal's hat.

Bednur, béd-noor', or **Bednore**, a decayed city, now a village, of Mysore, India; in the midst of a basin in a rugged tableland of the western Ghats, at an elevation of more than 4,000 feet above the sea, 150 miles northwest of Seringapatam. It was at one time the seat of government of a rajah, and its population exceeded 100,000. In 1763, it was taken by Hyder Ali, who pillaged it of property to the estimated value of £12,000,000, and subsequently established an arsenal here.

Bedott', Widow, the literary name of Mrs. Francis Miriam Whitcher, author of the once famous 'Widow Bedott Papers.'

Bedouin, béd'oo-ën or béd'oo-în, the name given to the nomadic Arabs, as distinguished from those settled in towns and villages and engaged in agriculture and manufactures. The Bedouin inhabit the deserts of Arabia and northern Africa, and are lean and short, but very active and capable of enduring great fatigue. They live mainly by 'hunting and pastoral occupations, and very little agriculture is carried on. Their food consists mostly of the produce of their herds, and they enjoy excellent health. Their temperament is cheerful, and they are honorable in their dealings with one another or with guests. Many of them, however, partly support themselves by robbery, but the statements regarding their marauding propensities seem to have been exaggerated. They live in tents, but frequently, when traveling, they sleep in the open air. Their religion is professedly Mohammedan, but is of a very simple character. The women grind corn and weave coarse cloths, and many of the tribes barter horses, camels, cattle, etc., for various necessities, such as arms and cloth. Some tribes gain part of their subsistence by escorting travelers, pilgrims, etc., across the deserts. They are monogamous, but divorce is easily obtained and frequent. Though generally very ignorant, they are by no means unintelligent; and they possess the lively fancy of most Eastern nations. The head of a tribe is the *sheik*, and they have also judges known as *cadis*. See Burckhardt, 'Notes on Bedouins and Wahabys' (1830); Blunt, 'Bedouin Tribes of the Euphrates' (1879).

Bedreddin Hassan, béd-réd-dën' has'san, the hero of the amusing cream tart story in the 'Arabian Nights Entertainments.'

Bedstraw, *Galium*, a genus of about 200 annual or perennial herbs with four-angled stems, natives mostly of the colder climates, whether of latitude or altitude, in the northern hemisphere. The species, which are mostly harsh-feeling weeds, are often attractive for their regular whorls of leaves and their pani-

BEEES



- 1 Drone
- 2 Queen
3. Worker, with front view of each

- 6 Comb with open and closed cells, (a), queen cell
- 7 A swarm, 8-15, Bee enemies

- 11a Male; 11b, female, and 11c, larvæ of the May worm
- 12, 12a Bee beetle and larva

BEE—BEE-EATER

cles of profuse minute, white, yellow, green or purple blossoms which in some species are used by florists to add "misty delicacy and airy grace" to bouquets especially of sweet peas, and to cover rock-work in and out of doors. The two species most cultivated for this purpose are *G. mollugo* (European) sometimes called baby's breath (see GYPSOPHILA), and *G. boreale* (American) Yellow bedstraw or cheese rennet (*G. vernum*), a species with yellow flowers, is used for curdling milk Its flower sprays yield a yellow dye when boiled in alum solutions and its roots a red one, said to rival madder as a wool dye For this use attempts at cultivation have been made in England This species, together with *G. trifidum* and *G. boreale*, reddens the bones and milk of animals that eat them in quantity Goose grass or cleavers (*G. Aparine*), a troublesome weed common to Europe, Asia, and America, yields a seed sometimes used as a substitute for coffee It is noted for the hooked prickles of its stems, fruits, and leaves In China *B. tuberosum* is cultivated for its farinaceous tubers Some species, for instance, *G. mollugo* and *G. rigidum*, have been tried in cases of epilepsy and others in cutaneous disorders

Bee, a name applied to those Hymenoptera which stand at the head of the order, and are represented by the bumblebee and the honeybee They differ from the wasps in the mouth parts being longer, especially the tongue or proboscis Each hind tibia is hollowed, broad, and so modified as to form a "honey-basket" The hairs are more or less spinulose or plumose, often of use in carrying pollen Bees are solitary or social in their habits, and form nests consisting of either a single or many cells, and of varying materials and degrees of complexity There are two families of bees (1) *Andrena*, comprising solitary bees, with the labian or under lip flattened and very short They excavate nests in turf and in grassy sunny fields, making a deep pipe or hole, with short lateral galleries in which the grub feeds and grows The species of *Halictus* and *Andrena* comprise the most common wild bees They entertain guest bees (*Nomada*). See GUEST-BEES

The family *Apida* includes the species of *Bombus* (see BUMBLEBEE), *Xylocopa* (see CARPENTER BEE); stingless bees (*Melipona*), and the honeybee (qv) *Apis mellifica* In the bees the labium is usually produced into a long, slender, hairy proboscis, which is bent under the body. It is very long in *Anthophora*, and in *Englossa* longer than the body The basal joints of the labial palpi are longer than the others The mouth-parts are complicated and adapted for manifold purposes connected with nest- or cell-building and the collection of nectar and pollen. Indeed the bees stand at the head of the insect series, whether we take into account their structure, mode of development, habits, instincts, and differentiation of the sexes, though the flies (*Diptera*) are in their way more specialized, but the specialization of certain parts in flies is accompanied by the degeneration and atrophy of others. The humblebee besides its ordinary use in nest-building employs its jaws to cut holes in flowers in order to reach the nectar.

The transformations of the bee are complete.

The larva is a footless maggot incapable of extended locomotion and lives in its cell where it is fed by the workers, or lives on pollen or honey stored up in the cell; the food is always derived from plants or other bees, although honeybees have been observed licking meat. The cells of the honeybee are open, the workers feeding the larvæ with a mixture of honey and pollen, the honey being specially adapted to be digested by the young. The larva transforms into the pupa within its cell, previously spinning a slight cocoon, or in the case of the honeybee simply closing the mouth of its cell with a cover of silk.

The sting of the bee acts also as an ovipositor; it is composed of three pairs of processes arising from the under side of the segments near the end of the abdomen, wherein is the poison-sac

Besides male and female, there are in the social species numerous barren females or workers, in which the ovaries are small and undeveloped Occasionally worker bees are capable of laying eggs and producing young The difference between the workers and the fertile females or queen is now known to be due to the difference in the food given to the larvæ; that of the queen larva being richer in nitrogenous substances than that fed to the larval workers Thus heredity has nothing to do with the matter; the larvæ of the workers and of the queen inherit the same peculiarities; the barrenness and smaller size of the worker bee is the result of being fed with different food

Bees are essential agents in the fertilization of flowers, in setting fruit, and were it not for them it is now supposed that we should not have had the irregular flowers of the pea and other papilionaceous plants It is a notable fact that the incoming or origin of flowers and of the bees and other insects which visit them was geologically about the same time At any rate bees ensure the existence of flowers and the latter have modified bees.

The number of known species of bees is upward of 5,000. They abound in all parts of the world, especially the tropics; while humblebees (*Bombus*) reach the polar regions and live as alpine forms on high mountain plateaux and ranges For the different kinds of bees, see also BEE-KEEPING; BUMBLEBEE; CARPENTER BEE; HONEYBEE; LEAF-CUTTING BEE; MASON BEE; STINGLESS BEE; also INSECT.

Bee-birds, birds that devour bees, especially the honeybee. Not many birds have this habit, the bees being protected against most birds by their stings. A few fly-catching birds, however, have learned how to avoid being stung, and catch not only bees but wasps, take them to a perch and beat them, so as to kill them, and probably get rid of the sting before swallowing them. Notable among these are the European and African bee-eaters (qv) The American kingbirds (qv), also catch bees, but not as frequently as is popularly supposed, and are known in the southern States as "bee-martins."

Bee-eater, a small, richly plumaged, and graceful bird of southern Europe and northern Africa, whose food consists almost wholly of bees and wasps, and which haunts the neighborhood of the hives of honeybees and devours these useful insects in great numbers. The bee-

BEE-KEEPING

eat-ers are related to the kingfishers, and like them dig deep nesting-holes in earthen banks, and lay pure white eggs.

Bee-keeping. Few persons who see the little boxes of honey in the market realize the importance and extent of the bee-keeping industry of this country. Careful estimates, based on United States statistics, and the output of large factories for the manufacture of bee-hives and honey-boxes, show that at least 125,000,000 pounds of honey is annually produced, making an aggregate of 5,000 carloads, or a train 35 miles long. The aggregate value of this, at a conservative figure, is \$10,000,000. When it is remembered that California alone, in a good year, can produce 500 carloads of honey, and that a good many of the other States produce from 50 to 100 carloads, one can form some idea of the commercial possibilities wrapped up in so small an animal as the bee.



Bee on the wing.

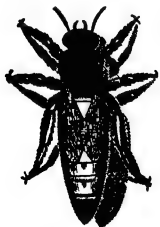


Bee on Red Clover

central, tupelo, palmetto, catclaw, mesquite, and guajilla

There are several races of bees — *Apis dorsata*, or the giant bee of India and of the Philippines; *A. Indica*, of India; *A. florea*, and *A. mellifica*. From a commercial standpoint, the last mentioned is by all odds the most important. It comprises the black or German bees of this country; the Italians, from the southern part of Italy; the Syrians, of Palestine; the Cyprians, from the island of Cyprus; the Carniolans, from Austria, and the Tunisians, from North Africa. But the most important of all of these varieties is the Italian. They are the most industrious and the gentlest. They, together with the black or German bees and their crosses, incorrectly termed "hybrids," are used most extensively in the United States — in fact, throughout almost all the civilized world.

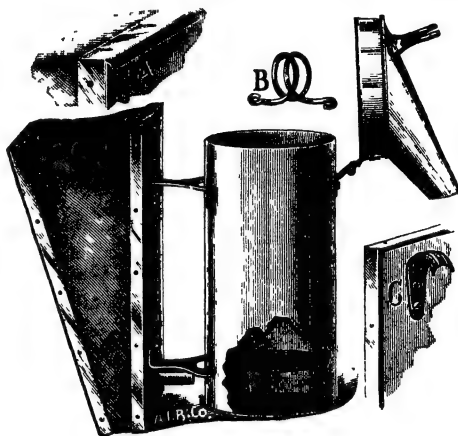
Three Kinds of Hive Bees—There are three kinds of bees in the hive; namely, the workers, or undeveloped females; the queen, a fully developed female, and the drone, or the male bee. The queen lays all the eggs of the hive, and may lay as many as 3,000 a day. Notwithstanding there may be from 10,000 to 100,000 bees in a single colony, the queen will be the mother of the whole colony. The drones are incapable of gathering honey, and serve only one purpose—that of fertilizing or fecundating the young queens, which act takes place in the air. The workers gather all the honey and pollen, fill all the combs, and rear the young or baby bees. As soon as the mating



Queen Bee.

season is over, the drones are shoved out of the hives and allowed to starve.

How to Handle Bees—There is a general impression to the effect that the ordinary honey-bees are vicious, ever in a towering rage, ready to attack any one who comes near their hives. This is a great mistake. Under certain conditions, when their habits are known, they can be handled almost like kittens; will permit one to tear their hives apart, rob them of their months and months of hard earnings—the honey and the wax—without even offering to sting. But an inexperienced or awkward per-



Bee-Smoker.

son may infuriate them to fearful vengeance. To bring them into a state of subjection it is only necessary to blow smoke into the entrance and over the combs, when, if the motions about the hive are careful and deliberate, they will offer no attack. Smoke, when intelligently used, disarms opposition, puts the bees in a quiet state, and enables their owner to do with them, within reasonable limits, whatsoever he will.

The bee-smoker is simply a small bellows attached to a sort of tin cup having a suitable snout from which the smoke is blown by the action of the bellows, forcing air through the cup in which there is a slow-burning fuel. Besides the bee-smoker, the bee-keeper generally uses a bee-veil made of mosquito-netting, Brussels net, or any suitable material, the same fastened to the rim of the hat, and tucked inside of the coat-collar or under the suspenders. Gloves are sometimes used by very timid persons or beginners; but as a general thing all work with the bees is performed with the bare hand. Stings are, of course, occasionally received; but beyond a sharp momentary pain no permanent effect will be felt after the first season; for the system of the bee-keeper very soon becomes

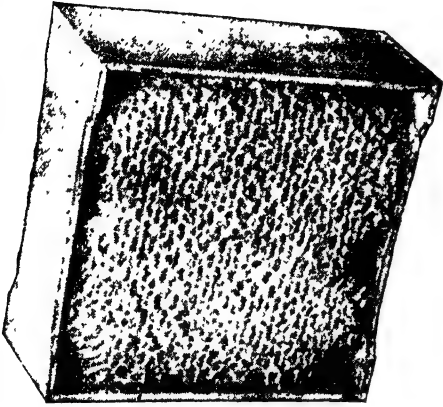


Bee-Veil.

BEE-KEEPING

inoculated so that no swelling takes place. There are many who receive from ten to twenty stings a day, without any ill effects; but if one will work carefully he will receive almost no stings.

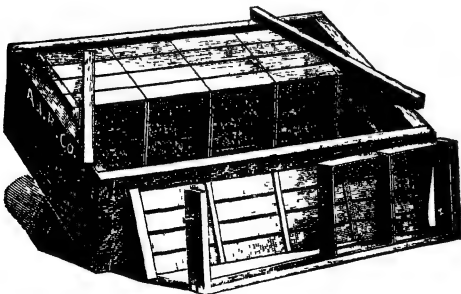
Marketable Products of the Hive—These are beeswax, comb and extracted honey, propolis or



Section of Comb Honey

bee-glue (sometimes used for making shoe polishes), and "apis mellifica," a homeopathic preparation taken from the poison sacs at the root of the stings of bees. While beeswax is an important product, and commands a good price in the United States, comb and extracted honey are the main sources of revenue to the bee-keeper.

Comb honey is usually put up in little square or oblong boxes, of which something like 50,000,000 are made and used in the United States annually. The honey in these boxes retails all the way from 12 to 20 cents. Extracted is honey in the liquid form, thrown from the combs by means of centrifugal force in a honey-extractor, hence the name. There are bee-keepers who make a specialty of producing honey in the comb, and others the same product free from the comb. The first mentioned can not be adulterated nor manufactured, newspaper reports to the contrary. One bee-keeper of considerable standing and prominence has had a standing offer of \$1,000 for a single

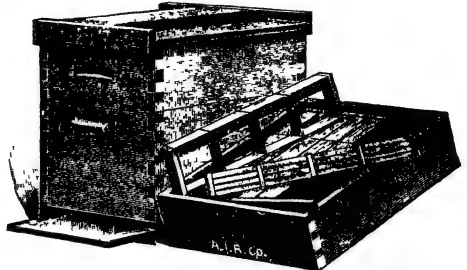


Comb Honey Super.

sample of artificial comb honey so perfect as to deceive the ordinary consumer. Notwithstanding that this offer has been broadly published over the United States for over twenty years, no one has ever claimed it.

It may be well to explain that a partial basis for these canards lies in the fact that bee-keepers use a commercial product known as "comb foundation," which is nothing more or less than sheeted wax, about an eighth of an inch thick, embossed on both sides with indentations having the exact shape and form of the bottom of the cells of honey-comb—hence the name. It is put into the hive, where the bees draw it out into comb. This is as far as the skill of man can go; hence there is no such thing as artificial comb; much less, artificial comb honey.

The business of producing comb honey re-



Bee Hive for Comb Honey.

quires some knowledge of the trade. Hives and supers require to be specially constructed, and so arranged that the little boxes containing strips of comb foundation shall be accessible to the bees where they can construct the foundation into comb, fill the cells with honey, and seal them over. When their owner finds that his little servants are busily at work in the



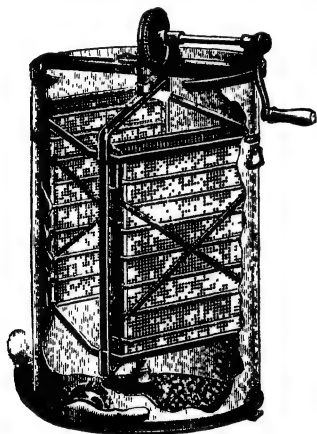
Uncapping Can.

fields; that the combs are beginning to whiten and to be bulged with honey in what is called the brood-nest, he puts on his honey-boxes in

BEE-KEEPING

the part of the hive he calls the "super." These are allowed to remain on during the height of the honey-flow until they are filled and capped over, when they are removed and others put in their place.

The business of producing extracted (or liquid) honey requires the same intelligent care and attention. Instead of section-boxes, however, an extra set of combs, or "brood-frames," as they are called, are put in the upper story, the same being placed above the lower or brood part of the hive. When these are filled with honey, and capped over, they are removed from the hive by first shaking the bees off, taken to the extracting-house, and extracted. The thin film of wax covering the comb is shaved off with a thin-bladed knife specially designed for the purpose. After the combs are uncapped they are put in the honey-extractor, and revolved at a high rate of speed. The honey flies out of the comb by centrifugal force against the



Honey Extractor.

sides of the extractor, when the combs are reversed, exposing the other surfaces, which are emptied in a like manner. They are next returned to the hive to be filled by the bees, when the process may be repeated as long as the season lasts.

Swarming—At the beginning of or during what is called the honey-flow, when the colony has reached a high state of prosperity, and the combs are being filled with honey, a swarm is liable to come forth between the hours of nine and three o'clock. Three-fourths of the bees, including the queen, are pretty sure to come out with a rush, filling the air with thousands and thousands of them. The bees hover about in the air for fifteen or twenty minutes, when they will in all probability cluster on some bush or tree. They will wait here for two or three hours, or perhaps as many days, at the end of which time they will take wing again and go direct into some hollow tree or cave where they will take up new quarters and start housekeeping anew. The young bees, with one or more young queens, are left to take care of the old hive.

In ordinary practice it is a custom for the bee-keeper to revive the swarm by taking the bunch of bees, as soon as it clusters, and putting it into another hive. Or he can, if he chooses,

clip the old queen's wings, preventing her flight with the swarm; and when the bees come forth she will crawl out of the entrance to be captured by her owner; and as soon as her subjects return, which they will do to find their royal mother, they are allowed to go into a new hive on the old stand, while the old hive is carried to another location in the bee-yard.

Robbing.—There are certain times during the season when no nectar is secreted by the flowers. It is during such periods as this that the bees will rob each other if they can, or help themselves at candy-stands or to the housewife's fruit-preserves during the canning season. When sweets can be obtained in considerable quantity, either from a weak colony unable to defend itself, or from man, the bees are apt to become furious, and their craze is not unlike that of gold-hunters when gold is discovered in large quantities. There is a rush, and when the sweets are suddenly cut off, the bees are inclined to be cross, and to sting. The wise and careful bee-keeper will see to it that the entrances of his weak colonies are properly contracted so that the sentinels or guards can protect themselves from intrusion from other bees.

Feeding.—The bee-keeper may, perhaps, take all the honey away from his bees, or nearly so, as his honey will bring two or three times as much as any cheap syrup costs him. Sometimes he finds it profitable to take the honey all away and give them syrup made of granulated sugar. The purpose of this, of course, is to keep them from starving during the time no honey is coming in from natural sources or during the winter.

Unting.—After the honey-flow, and just before winter comes on, there are liable to be many weak colonies. It is a common practice to put two or more of these together so as to make one strong stock. The combs from two or three different hives are put into one hive, and the bees are confined for several days with wire cloth over the entrance, when they are allowed to fly. Some of them will return to their old stands, but the majority of them will remain.

Wintering—Two methods are in vogue in the colder portions of the United States. One is, to put the colonies in double-walled hives, packed under chaff cushions, and contracting the entrances down to shut out as much cold as possible. The other is, to put the summer hives into a dry dark cellar as soon as cold weather comes on, leaving them there till spring.

Diseases of Bees—Bees are subject to diseases, like all domestic animals, such as dysentery, paralysis, and foul and black brood. Dysentery, as its name signifies, is a sort of bowel trouble due to the retention of the feces for an extended time during winter. If the bees are shut up without a chance for flight (for they never void their feces inside of the hive except when confined), their intestines become distended, and this finally results in purging. The only remedy is warm weather and a flight. Paralysis is a form of palsy that seems to affect the adult bees. Their bodies become swollen and shiny, the affected individuals crawling out of the entrance, and running into the grass to die. The remedy is to sprinkle powdered sulphur over the combs. Foul brood and black brood are germ-diseases that affect bees in the

BEE-KILLER — BEECH

larval or imago state. The little maggots become brown or black, and die, the dead matter finally assuming a sodden, gelatinous, or ropy condition. When it attacks a colony shake the bees into a clean hive, and put them on frames of foundation. For three or four days feed them sugar syrup. The old combs, including the frames, must be burned. If the hive has been soiled by the tainted honey or dead matter, it must be scalded out or held over flames for a few seconds. Any honey taken from the hive may be rendered safe to give to the bees by boiling it for two hours.

Bibliography—Root, 'A B C of Bee Culture' (1903); Miller, 'Forty Years Among the Bees'; Langstroth, 'The Honey-Bee,' revised edition (1889); Hutchinson, 'Advanced Bee Culture' (1902); Cook, 'Manual of the Apiary' (1902); Root, 'Quinby, New Bee-keeping,' and the following periodicals: 'American Bee Journal,' published in Chicago, Ill.; 'Gleanings in Bee Culture,' Medina, Ohio; 'Bee-keepers' Review,' Flint, Mich.; 'American Bee-keeper,' Fort Pierce, Fla.; 'Progressive Bee-keeper,' Higginsville, Mo.

E. R. ROOT,

Author of 'A B C of Bee Culture' and Editor of 'Gleanings in Bee Culture'

Bee-killer, one of the robber-flies (q.v.), of the dipterous family *Asilidae*, some of which are known to seize with their sharp lancet-shaped beak bumblebees and honeybees, and suck their blood. This species *Trupanea apivora*, the bee-killer, captures the honeybee while on the wing, and one such fly has been known to kill 141 bees in a single day. These flies are stout-bodied, hairy or bristly, with a long abdomen; the mouth-parts are much developed and adapted for piercing. The maggots live in the soil, preying on the grubs of beetles, or on the roots of plants.

Bee-larkspur. A well-known flowering plant, *Delphinium grandiflorum*.

Bee-line. The shortest route to any place, that which a bee is assumed to take; though, in fact, it often does differently in its flight through the air.

Bee-louse (*Braula coeca*) is a parasite on the honeybee, occurring on the thorax especially of the queen bee—rarely on the drones. Benton states that he has at one time removed as many as 75 from a queen, though the numbers do not generally exceed a dozen. It is the sole member of a family (*Braulidae*) of flies closely allied to the horse flies (*Hippoboscidae*) and the bat-ticks (q.v.). The bee-louse is about one twentieth of an inch in length, entirely without wings, and somewhat spider-like in appearance. On the day the maggot or larva hatches from the egg it sheds its skin and turns to an oval puparium of a dark-brown color. It has frequently been imported to this country on queens with attendant bees but has gained no foothold.

Bee Moth, or **Wax Moth**, a moth belonging to the family *Galleriidae*; specifically, *Galleria mellonella*, the larva of which feeds on wax in hives. The worm is yellowish-white with brownish dots. It constructs silken galleries running through the comb of the bee-hive on which it feeds. When about to transform it spins a thick white cocoon. Two broods of the

moth appear, one in the spring, the other in August, and the caterpillars mature in about three weeks. It may become a most troublesome pest in the apiary.

Bee-orchis, the name of a species of orchis, the *Ophrys apifera*. It is so called because a part of the flower resembles a bee. It is large, with the sepals purplish or greenish-white, and the lip brown variegated with yellow.

Bee-tree, a forest tree inhabited by honey-making bees, which have taken possession of some natural hollow and filled it with combs. Such a tree may be found by accident, or by deliberate hunting. Those in search take to the edge of the woods a box of diluted honey, and when they see bees near them, open the bait to which one by one the bees will be attracted. The direction of their flight is then carefully observed; the bait is moved to another point, and new observations taken, and the converging lines followed until they intersect at the tree. As most of these bee-tree colonies are escaped swarms the capture of the bees themselves is more important than merely to get such honey as may be there. The best plan is therefore to climb to the nest, if possible, and gather the combs and contents to be let down in a pail or basket, or else saw out the whole section of the tree containing the nest and lower it to the ground. Full directions for this complicated proceeding are given by Root, 'A B C of Bee Culture' (1903).

Beech, a small genus (*Fagus*) of handsome forest trees of the natural order *Fagaceae*, divided by some botanists into two genera: *Eufagus*, containing five species natives of the northern hemisphere; and *Nothofagus*, embracing 12 species indigenous to the southern hemisphere. The American beech (*Fagus ferruginea*), and the European or common beech (*F. sylvatica*), are closely similar. They often attain heights exceeding 80 feet, and girths greater than 3½ feet. The former has smooth, light-gray bark, a broad round head, and leaves which turn yellow before they fall in the autumn; the latter has dark-gray bark, is more ovate in general outline and has shining leaves which persist during most of the winter. The tree scarcely bears fruit before the 50th year of its age, and then not every year. After the 140th year, the wood-rings become thinner. The tree lives for about 250 years. Some stems are fluted, some even twisted. The roots stretch far away, near to the surface of the soil, partly above it. Young beeches are useful for live hedges, as they bear pruning, and as their branches coalesce by being tied together, or by rubbing each other. Amputations of limbs, and deep incisions in the tree, soon become obliterated by the bark, which contains a peculiar periderma. The dead leaves are often used by the poor of Europe for stuffing beds and pillows. Each yields pleasant, edible, three-angled nuts, usually in pairs in prickly involucre. These nuts are eaten by swine, deer, and poultry, and in France, and to some extent elsewhere, are pressed to extract a mild culinary long-keeping oil. Both species thrive in light, limy loams, upon which formations they often become the leading species of tree, covering large tracts. They do not grow in damp situations. Their reddish-brown, solid, hard but brittle wood makes excellent fuel, and is largely used

BEECH DROPS—BEECHER

for making tool handles where bending and twisting are not expected. The wood is not durable in contact with soil, but since it is remarkably lasting when immersed in water, it is largely used in dams, water-mills, sluices, etc. The wood of the European species is preferred to that of all other species, except walnut, for making shoes (*sabots*), in France, since it is remarkably resistant to the entrance of water. The bark is sometimes used in tanning. Both species are used in ornamental planting on account of their symmetrical forms, the colors of their bark and foliage, which latter is remarkably free from the attacks of disease and insects. The European species has produced a large number of varieties, of which the copper or purple beech is probably the best known in America. *F. Sieboldi*, a native of eastern Asia, is sometimes planted for ornament. *F. Cunninghamii*, the "myrtle tree" of Tasmania, is a large tree with leathery birch-like leaves. *F. betuloides*, a Terra del Fuegian species, is a striking feature of the winter landscape on account of its ever-green foliage. Its wood is used for flooring vessels, and is exported to the Falkland Islands and elsewhere for roofing. Blue or water beech, better known as American hornbeam (*Carpinus americana*), is a common tree in damp woods and along streams. It is not a member of this genus. See HORNBEAM.

From the wood of the beech an especially pure form of creosote is obtained that is largely employed in the treatment of chronic lung disorders. See CREOSOTE.

Beech Drops, a plant parasite on beech tree roots. See CANCER ROOT.

Beecher, Catherine Esther, American educator and philanthropist, eldest daughter of Lyman Beecher: b. East Hampton, L. I., 6 Sept. 1800; d. Elmira, N. Y., 12 May 1878. Her faith and life were nearly wrecked at 22 by the loss of her betrothed, Prof. A. M. Fisher of Yale, in a shipwreck, and she lived unmarried, plunging into work as a relief; but she had the Beecher energy which could hardly have remained quiet in any case. From 1822 to 1832 she managed a girls' school in Hartford, Conn., with remarkable success and repute; she wrote some of her own class-books, one on mental and moral philosophy being afterward used in colleges. From 1832 to 1834 she kept a similar school in Cincinnati, in order to be with her father, who was at the head of Lane Seminary; but her health compelled her to abandon it. For the rest of her life she worked with heart and soul to advance the education of women and girls, physical and social, as well as intellectual and moral, for she believed in the full harmony of all inborn human qualities. She organized a "National Board of Popular Education," to train women teachers, especially for the South and West, and traveled and wrote extensively in this behalf. As with most persons of much force, she had many "fads" and eccentricities; but she was a high-minded, accomplished, and charming woman, full of wit and executive capacity. Her first work was on the 'Difficulties of Religion' (1836); among others were 'True Remedy for the Wrongs of Women' (1851); 'Physiology and Calisthenics' (1856); 'Common Sense Applied to Religion' (1857); 'Woman's Profession as Mother and Educator, with Views in Opposition to Woman Suffrage' (1871).

Beecher, Charles, American clergyman, son of Lyman Beecher: b. Litchfield, Conn., 7 Oct. 1815; d. Haverhill, Mass., 21 April 1900. He was educated successively at the Boston Latin School, the Lawrence Academy at Groton, Mass., and at Bowdoin College, graduating 1834. He then studied theology under his father at Lane Seminary, Ohio, and in 1844 was ordained pastor of a Congregational church at Fort Wayne, Ind. Leaving there in 1851, he was pastor in Newark, N. J., till 1854, and in 1857 took charge of a church in Georgetown, Mass. He lived in Florida, 1870-7, and was State superintendent of public instruction there for two years, and was stated supply at Wysox, Pa., in 1885. His best work was in the selection of the music for the famous 'Plymouth Collection' of hymns, he having fine musical taste. He wrote 'The Incarnation' (1849); 'David and His Throne' (1855); 'Pen Pictures of the Bible' (1855); 'Redeemer and Redeemed' (1864); 'Spiritual Manifestations' (1879); and 'Eden Tableau' (1880). He also edited his father's autobiography and correspondence (1863).

Beecher, Charles Emerson, American palæontologist: b. Dunkirk, N. Y., 9 Oct. 1856; d. New Haven, Conn., 14 Feb. 1904. He graduated at the University of Michigan 1878, studied under Prof. James Hall at Albany, N. Y.; in 1888 was given a position in this department at Yale; in 1892 was made professor of historical geology; and in 1892 succeeded Prof. O. C. Marsh as professor of palæontology and curator of the geological collections. He has written over 50 papers for scientific periodicals, and the proceedings of scientific societies, chiefly on evolution, especially as illustrated by the growth and structure of trilobites, and on the classification of trilobites and brachiopods; a number of these and similar studies on other organisms were collected as 'Studies in Evolution' (1901), one of the Yale bicentennial publications. He also published a memoir on the *Brachiospongidae* in the Yale Peabody Museum Memoirs (1886).

Beecher, Edward, American clergyman, son of Lyman Beecher: b. East Hampton, L. I., 27 Aug. 1803; d. Brooklyn, N. Y., 28 July 1895. Graduating at Yale 1822, he studied theology at Andover and New Haven, and in 1826 was ordained over Park Street Church in Boston; which he left in 1830 to take the presidency of Illinois College, Jacksonville, Ill., a theological school, whence many of Dr. Beecher's pupils went to be pastors and teachers in the new West. He returned to Boston in 1844 as pastor of the Salem Street Church; in 1856 went to the Congregational church at Galesburg, Ill., remaining till 1872, also holding for some years a professorship of exegesis at Chicago Theological Seminary. He had been a regular writer for the *Christian Union* since 1870, and in 1872 retired from the ministry, removed to Brooklyn and devoted himself entirely to writing and missionary work, contributing to the *Christian Union*, and editing the *Congregationalist* for six years. Of his books, the two most discussed were 'The Conflict of Ages' (1853), and 'The Concord of Ages' (1860), a transference into terms of Christian theology of the doctrines of pre-existent and continuously existent souls and the dualism of good and evil, the struggle of the two being prolonged into a future life and good finally triumphant. Besides sermons, etc.,



BEECH TREE (*Fagus sylvatica*).

BEECH . DETAILS



1 Young branch with male and female flowers
2 Single male flower

4-5 Fruit and fruit case
6 Twig with two buds

BEECHER

he also published a 'History of the Alton Riots' (Cincinnati 1837); 'Baptism' (1850); 'Papal Conspiracy Exposed' (1855); 'History of Opinions on the Scriptural Doctrine of Future Retribution' (1878).

Beecher, Henry Ward, American clergyman, eighth son of Lyman Beecher: b. Litchfield, 24 June 1813; d. Brooklyn, N. Y., 8 March 1887. He was the offspring of a union which has produced some of the world's greatest influences, and in theory ought always to produce them — of a stern, energetic, high-principled father, with a sweet and beauty-loving mother, giving power and continuity to sensibility and sympathetic emotion. Macaulay and Victor Hugo are notable instances in this respect. He had a rather bare, hard childhood, under a father and stepmother who both considered duty and enjoyment hardly compatible. The great genial orator who shouted down and won over hostile mobs was a shy and sensitive boy; the editor, author, and book-lover had a wretched memory, disliked study, and wanted to go to sea. But the religious atmosphere was around him: "converted" in a revival, he decided to train for the ministry, entered the Boston Latin School in 1826, then the Mount Pleasant School at Amherst, graduated from Amherst College 1834, and began a theological course under his father at Lane Seminary. He revolted at his father's sulphurous theology, however, and for a short time in 1837 was editor of an anti-slavery paper in Cincinnati, fervid love for humanity holding first place with him then as always. Later in the year he took charge of a country church at Lawrenceburg, Ind., and married Eunice White Bullard, of West Sutton, Mass., to whom he had been seven years engaged. In 1839 he was called to a church in Indianapolis, then a town of 4,000 people, remaining there eight years and becoming widely known both as a revivalist of great power and a preacher of delightful humor and originality. In 1847 he was called to Brooklyn to take charge of a new church of nine members, called Plymouth Church. He held this pastorate for 40 years, lacking a few months; and for the most of the time the church was not only a Mecca to the vast class seeking to retain Christianity while forced to discard very much in the way of theology, but the fountain of a stream of influence acting powerfully on the moral and social, and sometimes the political tendencies, of the age. He preached on whatever related to the public welfare, probed every evil and championed every reform, especially of intemperance and slavery. His outspoken courage, strength of thought, and felicity of expression, his exhaustless wealth of eloquent rhetoric, humor and pathos, dramatic force, and apt analogy and illustration, not only drew to hear him one of the largest permanent congregations in the United States — his immense church with its seating capacity of nearly 3,000 being constantly crowded — but made his pulpit one of the most famed and influential of the English-speaking world; his utterances forming a basis of action for many. He was not a theologian in any sense, and his influence rested on his abstinence from credal logic: he was the spokesman of those who fear that if they compute their doctrinal latitude they may discover much more than they wish to know, and

prefer to keep the fruits of faith by evading exact definition rather than lose them by a rigid self-inquiry. To the orthodox of his day he seemed an underminer; though to many at the present he seems conservative enough. He believed in the divinity of Christ, in immortality, in special providences and miracles, in the Bible as a divine revelation by fallible human instruments; he did not believe in eternal punishment (which he publicly denied in 1878), election and reprobation, the fall of Adam, the vicarious atonement, or imputed sin and righteousness; and he declared the orthodox Deity "barbaric, heinous, hideous." He gave his whole soul to the work of preaching, often delivering several discourses in a single day; but such was his physical and mental vigor that he accomplished work in several other directions sufficient in each case for an able and lusty man. He was one of the giants in oratory of the anti-slavery time; and none of the champions of the cause was more hated and reviled than "the abolitionist Beecher," whose work was excelled only by that of his great sister, and who left his pulpit in the Fremont campaign to denounce the Kansas crime, joining the Republican party on its inception and traveling great distances to speak at its meetings. Yet he was not an abolitionist like Phillips and Garrison, and like Lincoln and the mass of the Republicans, held that Congress could not interfere with slavery in the South, but only prevent its extension. The pro-slavery party drew no fine distinctions, however, and the northern Democratic papers all through this period are filled with denunciation and caricature of him. His series of speeches in England in the fall of 1863 helped to turn the tide of English opinion in favor of the North. The prime element of his success was his enormous physical vitality: he tired out the mobs which howled him down, by actual bodily endurance and power of lungs, before he began the splendid addresses which made them at least enthusiastic admirers of himself, if not perhaps converted believers in the Union. He had the "rapture of the strife" which Attila knew: he loved to be the target of a ring of opponents as well as John Quincy Adams, though without his bitterness, and was as instant and unflinching in retort; a dozen taunts hurled at him in a breath met a dozen crushing but never malicious answers. He was for many years one of the most popular lecturers and after-dinner speakers in America. Of his set orations, those at the Burns centennial of 1859, and by government request at Fort Sumter, in April 1865, on the anniversary of its capture by the Confederates are most famous. He occupied several editorial positions: editing the *Independent* 1861-3; founding the *Christian Union*, editing it 1870-81; was a fertile sketch writer, and wrote a novel and a 'Life of Christ.' Besides this, he was an enthusiastic amateur farmer, and loved outdoor nature passionately, as well as art and the drama. His open, impressible, sensitive nature responded readily to all things that stimulate the intellect, the heart, or the soul. He was essentially a man of impulses and inspirations, trusting to the spontaneous suggestion of the moment, often not even making notes for a sermon; but like all men who make any impress on the world, kept himself filled with material for inspiration to work on,

both from books and life. He always lamented that it had not been permitted him to lead a life of scholarship; but in fact he did not lead it because he was not willing to pay the price for it, of abstinence from leadership in the political and social life of the time. He never lacked courage to take a side, right or wrong, and often grieved and alienated large bodies of his friends by doing so when passions were hot. He was a firm adherent of the Seward-Johnson policy of reconstruction in 1866, despite the terrible results to which its prematurity led; sympathized with the Greeley movement in 1872; and braved a threatened disruption of his church in 1884 by voting and speaking for Cleveland. He believed in and advocated free trade and woman suffrage. So brave and impulsive a nature was always shocking the conventions of his order. Naturally, he was forever perpetrating indiscretions in speech, to the delight of his enemies and the discomfiture of his friends. Tact was unfortunately not a large inheritance of most of Lyman Beecher's children, and the paucity of Henry Ward's share was the cause of many an inept and unfortunate public utterance; while his fertility of comparisons and analogies often led him into pithy exaggerations and a humorous extravagance of language which his opponents could easily disprove in the letter.

In 1874 Mr. Beecher's former associate and later successor in the editorship of the *Independent*, Theodore Tilton, charged him with criminal intercourse with Mrs. Tilton. A committee of Plymouth Church examined the case and exonerated Mr. Beecher; but Tilton had brought suit for \$100,000 against him, and after a six months' trial the jury disagreed, a week's confinement and 52 ballots showing nine for conviction and three for acquittal. The long public scandal seriously affected Beecher's influence with the outside public, but his own congregation stood loyal to him; and while his 'Life of Christ' was unsalable, and the last two volumes not published till long after his death, his sermons and some of his essays remain popular.

Mr. Beecher's first literary work was done in his Indianapolis pastorate, where he edited an agricultural paper, and wrote for it articles afterward republished as 'Fruits, Flowers, and Farming'; and published his first book, 'Lectures to Young Men' (1844). For 20 years after coming to Brooklyn he contributed regularly to the *Independent*, signing with a (*), whence the two-volume collections of 1855 and 1858 were termed 'Star Papers.' He was also for some time a regular contributor to the *New York Ledger* of 'Thoughts as They Occur,' collected in 1864 as 'Eyes and Ears'; and wrote serially for it his one novel, 'Norwood' (1867). His sermons were reported in full after 1859, and the collected volumes are termed 'Plymouth Pulpit.' A two-volume selection revised by the author was issued by Lyman Abbott in 1868; other compilations from them are 'Life Thoughts' and 'Notes from Plymouth Pulpit' (1859); 'Pulpit Pungencies' and 'Royal Truths' (1866); 'Morning and Evening Devotional Exercises' (1870); and 'Comforting Truths' (1884). For some years, also, his prayers, of great charm and high quality as compositions, were taken down by phonograph, and a collected volume issued in 1867. Other of his works are: 'Freedom and War' (1863); 'Aids to Prayer' (1864); 'Lecture-Room

Talks' (1870); 'Yale Lectures on Preaching' 3 vols. 1872-4); 'Evolution and Religion' (1885). Individual sermons and addresses were published also, such as 'The Strike and Its Lessons' (1878); 'Doctrinal Beliefs and Unbeliefs' (1882); 'Wendell Phillips' (1884); 'A Circuit of the Continent' (1884). He also edited the famous 'Plymouth Collection' of hymns (1855); and 'Revival Hymns' (1858). His life was written before his death by Lyman Abbott (1883), and Samuel Scoville (1888); see also 'Autobiographical Reminiscences of Henry Ward Beecher,' by T. J. Ellinwood, who was his private stenographer for 30 years.

Mr. Beecher's wife, EUNICE WHITE BULLARD, was born in West Sutton, Mass., 26 Aug. 1812; d. Stamford, Conn., 8 March 1897. She wrote articles for periodicals, some of them afterward collected: also 'From Dawn to Daylight' (1859), a story of her early married life; 'Motherly Talks with Young Housekeepers' (1875); 'Letters from Florida' (1878); 'All Around the House' (1878); and 'Home' (1883).

Beecher, James Chaplin, American clergyman, son of Lyman Beecher. b. Boston, Mass., 8 Jan. 1828; d. Elmira, N. Y., 25 Aug. 1886. He graduated at Dartmouth 1848, studied theology at Andover, and in 1856 was ordained a Congregational clergyman; thence till 1861 was chaplain of the Seamen's Bethel in Canton and Hong Kong, China. Entering the Civil War as a chaplain, he rose to the rank of brevet brigadier-general and subsequently held pastorates in Owego, N. Y., 1867-70, Poughkeepsie 1871-3, and Brooklyn 1881-2. After 1864, a sufferer from mental troubles, his last three years were passed in much distress, and he finally committed suicide.

Beecher, Lyman, American theologian: b. New Haven, Conn., 2 Oct. 1775; d. Brooklyn, N. Y., 10 Jan. 1863. He was a blacksmith's son and himself a blacksmith's helper and farmer's lad in boyhood. Entering Yale College at 18, he graduated in 1797, studying also theology under President Dwight till 1798, when he became supply at East Hampton, L. I., and was ordained there 1799, remaining till 1810. His remarkable pulpit oratory gained national repute from a sermon in 1804 on Alexander Hamilton's death at Burr's hands — an occasion which made more than one reputation, all utterances being eagerly scanned from the excitement and party feeling. In 1810 he was called to Litchfield, Conn., the seat of a celebrated law school and other educational institutions, at a time when New England was the intellectual autocrat of the country, and towns were few and small; and soon became recognized not only as the foremost man in the Congregational body, but one of the greatest of American preachers. About 1814 a half-dozen sermons of his against intemperance, then a common vice among even the clergy, were not only widely read in America and England, but were translated into several foreign languages. He also took a foremost part in organizing Bible and missionary societies, etc.; and his courage, power, and energy made many look to him for guidance and succor in trouble. This came in a flood during the next decade, when the Unitarian movement, under Channing and its other great early leaders, was sweeping the Congregational churches



HENRY WARD BEECHER.

BEECHER

around Boston off their feet; and Mr. Beecher, in 1826, at the urgency of influential clergymen, accepted a call to the Hanover Street Church in Boston to stem the tide, which his polemic ardor perhaps aided in doing. In 1832 he accepted the presidency of Lane (Theological) Seminary near Cincinnati, Ohio, which had been endowed on the express condition of his taking charge of it, to strengthen Calvinism in the rapidly growing West; he remained there till 1852, holding also the chair of sacred theology, and was its titular president till death. He was also pastor of the Second Presbyterian Church in Cincinnati 1832-42. In 1833 the famous philanthropist Arthur Tappan, the chief founder of Lane, sent the students a report of the proceedings of the Philadelphia abolition convention of that year; the students, partly southern, at once fell into disputes on the subject of slavery. The trustees vainly tried to check the meetings and discussions; Kentucky slaveholders came over and urged violent suppression of these meetings and threatened the destruction of the seminary. The trustees in terror forbade all further discussion of slavery, and therefore all the students deserted in a body. The most of the anti-slavery wing refused to return, and their supporters founded Oberlin College; a few came back, and Mr. Beecher and his son-in-law Calvin E. Stowe tried for many years to build up the seminary again, but in vain. Shortly after this, in 1835, he was tried as a heretic and hypocrite, first before his own church and then before the Presbyterian Synod, for his "moderate Calvinism"; he was acquitted, but the Old School and New School controversy finally split the church in 1838, Mr. Beecher adhering to the New School party. In 1852 he resigned the presidency of Lane and returned to Boston, to prepare his works for publication; but was stricken with a slow paralysis of the brain, which enfeebled his mind for many years before his death. Despite the impressions of the extreme orthodox party, he was of the firmest doctrinal faith, though his theology was of his own make, and his humorous audacities of speech often shocked dignified propriety. His boundless energy, boldness, unconquerable will, and personal magnetism, were those of a natural leader of men; while his unsurpassed logical power, his intense and compact expression, and above all his entire sincerity and spirituality of purpose, winged with his racy and picturesque wit, set him above every other American clergyman of his time in popular influence. See his 'Autobiography and Correspondence,' edited by his son Charles, 1865.

Beecher, Thomas Kinnicutt, American clergyman, son of Lyman Beecher: b. Litchfield, Conn., 10 Feb 1824; d. Elmira, N. Y., 14 March 1900. He studied at Illinois College, of which his brother Edward was president, graduating in 1843. He was principal of a Philadelphia grammar-school 1846-8, of the Hartford (Conn.) High School till 1852. He then removed to Williamsburg (Brooklyn), N. Y., and founded a Congregational Church, which he left two years later for the pastorate of a church in Elmira, N. Y., where he spent the rest of his life, well-known as an unsectarian philanthropist and moral teacher, writer, and lecturer, editing for many years a weekly depart-

ment in Elmira newspapers to discuss current questions, often with rasping originality and always with independence. He was nominated for a variety of offices by nearly every known political party, but never elected. He was a chaplain in the Army of the Potomac four months in 1863. In 1870 he published a series of lectures as a book, entitled 'Our Seven Churches' (of Elmira); and in 1901 a posthumous collection of his juvenile stories was issued, 'In Tune with the Stars.'

Beecher, Willis Judson, American clergyman and author: b. Hampden, Ohio, 29 April 1838. He was graduated from Hamilton College in 1858, and from Auburn Theological Seminary in 1864, and filled several Presbyterian pastorates. From 1865-9 he was professor of moral science and belles-lettres in Knox College, Ill., and in 1871 became professor of the Hebrew language and literature in Auburn Seminary. He has published: 'Farmer Tompkins and his Bible' (1874); 'Drill Lessons in Hebrew' (1883); 'Index of Presbyterian Ministers in the United States 1706-1881' (1883); 'Old Testament Notes' (1897); and hundreds of articles in newspapers, periodicals, cyclopædias and reference books.

Beecher Family, The, an extraordinary American family of religious and humanitarian leaders, mostly of such salient and frequently eccentric originality, combined with immense energy and independence of thought, that the human race was once said to consist of "men, women, and Beechers." They were all descendants of Lyman Beecher of New Haven, Conn., himself one of the most notable of them; a famous clergyman, orator, and controversialist, who had 13 children, so many of whom rose to national or even international distinction that he was said to be "the father of more brains than any other man in America." Eight of them were boys, seven living to maturity, and nearly all of them to extreme old age, all becoming Congregational ministers; and the greatest, Henry Ward, said of them that "only one tried to escape the ministry, and he did not succeed." But so great was the intrinsic force of the blood that the daughters were no whit inferior in persistence of energy and originality of ideas, that marriage did not in the least quench their outside work and influence, and that one of them has shown the highest creative genius and left the most enduring memorials of the entire family. The difference in work and sympathies of father and children resulted from difference of generation rather than of spirit. Lyman Beecher's problems were mainly religious. He lived at the threshold of the new material development of the country, when it seemed that the engrossing task was to prevent its relapsing to heathenism; at the beginning of the great liberalizing flood of new scientific knowledge, when there seemed a danger of all Christianity being swept away with the cosmology it rested on; and before the humanitarian questions in this prosperous country had come to the fore. He was nearly 60 when the slavery problem first showed signs of becoming acute; more than 60 when Father Mathew established his first temperance society across the water; and at no period would he ever have favored woman suffrage, which one even of his notable daugh-

BEECHEY — BEEF-TEA

ters wrote against. But his influence was intensely strong in creating the lofty spirit that fed humanitarianism. It is an encouragement to large families, as so often in history, that the greatest of his children were among the younger ones: Mrs. Stowe was the sixth and Henry Ward Beecher seventh, while the most forceful of the others, Isabella (Mrs. Hooker), was the eleventh. In their order, the ones who grew up were Catherine, William Henry, Edward, Mary, George, Harriet, Henry Ward, Charles, Isabella, Thomas, and James. Catherine, robbed of the betrothed of her youth, gave herself to work for her sex, though not with quite the aspirations of most recent women of her type, and perhaps did as much good in training cultivated wives and mothers as if they had remained unmarried teachers. William Henry was a home missionary and clergyman in Ohio, and a clergyman in the East. Edward was a clergyman, editor, and theological writer, who tried to pour antique Zoroastrianism into modern molds. Mary married in Hartford, Conn., and became the mother of Frederick Beecher Perkins and grandmother of Charlotte Perkins Stetson. George died by accident at 34, while filling a western pastorate. Harriet, author of 'Uncle Tom's Cabin,' and of a mass of other works which would give any other author one of the foremost places in American letters, has a secure immortality from her masterpiece. Henry Ward, creator of the greatness of Plymouth Church, a Moses of liberal Congregationalism, anti-slavery and temperance leader, ardent in all work for humanity and the elevation of the mass, need not be further characterized. Charles, clergyman and admirable musician, is gratefully remembered for his work in compiling the 'Plymouth Collection' of hymn-tunes. Isabella married John Hooker, a Hartford lawyer fully in sympathy with her, and has been for many years one of the staunchest champions of woman's rights and upholder of all good causes. Thomas, for some 40 years located in Elmira, N. Y., was noted as an able and independent thinker on all public questions, which he discussed with ability and high-mindedness. James C. was clergyman, soldier, and clergyman again, till shadows overclouded his mind and brought on a tragic death. Altogether, the family is one of the most useful as well as distinguished of the American intellectual aristocracy.

Beechey, Frederick William, English admiral, the son of Sir William Beechey the painter: b. London 1796; d. 28 Nov. 1856. He entered the navy at the age of 10, and in 1811 was present in an engagement off Madagascar, in which three French frigates were captured. In 1818 he accompanied Lieut. (afterward Sir John) Franklin in an expedition to discover the northwest passage, and the following year took part in a similar enterprise with Capt. Parry. In 1821 he was commissioned, with his brother H. W. Beechey, to examine by land the coasts of north Africa. During the years from 1825 to 1828 he was engaged as commander of the Blossom in another Arctic expedition, by way of the Pacific and Bering Strait. Of this he published an account: 'Narrative of a Voyage to the Pacific and Bering Strait' (1831), and subsequently a description of the botany and zoology of the regions visited. In 1854 he was raised to the rank of rear-admiral.

Beechey, Sir William, eminent English portrait painter: b. Burford, Oxfordshire, 12 Dec. 1753; d. Hampstead, 28 Jan. 1839. He entered a conveyancer's office, but soon abandoned it, and determined to make painting his profession. In 1772 he was admitted to the Royal Academy. A large equestrian picture of George III secured his election as a Royal Academician and procured him the honor of knighthood. He was afterward constantly and lucratively employed. He died in 1839 at the advanced age of 86. His attitudes and expression are generally good, but marks of carelessness are apparent in some of his latest pictures. Two portraits by him are contained in the Metropolitan Museum of Art in New York.

Beeching, Henry Charles, English clergyman and author: b. 15 May 1859. He was educated at Balliol College, Oxford, was rector of Yabbendon, Berkshire, 1885-1900, and has been professor of theology at King's College, London, from 1900. He has published editions of Milton, Vaughan, Daniel, Drayton, and several anthologies of verse, and is author of 'Love in Idleness' (1883); 'Love's Looking Glass' (1891); 'Seven Sermons to Schoolboys' (1894); 'In a Garden and Other Poems' (1895); 'Pages from a Private Diary' (1898); 'Conferences on Books and Men' (1900); 'Inns of Court Sermons' (1901); 'Religio Laici' (1902); 'Jane Austen' (1902); 'Two Lectures on Poetry.'

Beef. See MEAT.

Beef-eater. See BUFFALO-BIRD.

Beef-eaters, a popular name for the yeomen of the guard of the sovereign of Great Britain, a body instituted in 1485. There are now one hundred in service, and seventy supernumeraries. They are dressed after the fashion of the time of Henry VII. The warders of the Tower of London, who wear a similar uniform, are also so called.

Beef-tea, a preparation made from raw beef and often employed in nursing. It is serviceable for stimulation or for nourishment largely according to the method of its preparation. As usually made, or as prepared from ready-made beef extracts, it has very little food value, but is a strong heart stimulant. When fresh beef is finely chopped and its juice squeezed from it and flavored, to take away the raw taste, the extract obtained is rich in the muscle juices and is highly nutritious. It is often thus prepared for infants and invalids. If, however, the juice thus obtained is mixed with water and the compound is boiled, as is the usual manner, all of the muscle proteids are coagulated, as a scum, and the muscle salts, or extractives remain in solution. The nutritious portions, the scum, is thrown away and the extractives retained in the tea. In this form the nutritive value is slight unless the coagulated proteid is retained. Ordinary meat extracts are mixtures of the meat extractives, xanthin, hypoxanthin, creatin, creatinin, etc. These are heart tonics but not nourishing. Their use is contraindicated in irritable hearts, in gout, and in any condition in which it is thought that the patient is not breaking down the normal amount of proteid matter. Broths are made of other meats. See also DIETETICS; FOODS FOR THE SICK.

BEEF-WOOD — BEERS

Beef-wood, a popular name for the wood of several Australian trees of the genus *Casuarina* (q.v.), which forms the type of a family *Casuarinaceæ*. The trees have been compared to gigantic horse-tails. They have pendent leafless branches, and apetalous monœcious flowers, the male ones being in spikes, and the female in heads. The wood is of a reddish color (whence the name), hard, and close-grained, and used chiefly for fine ornamental work.

Beehive Houses, the archæological designation given to ancient dwellings of small size and somewhat conical shape, found in Ireland and Scotland. They are formed of long stones without cement, each course overlapping that on which it rests. Sometimes they occur singly, at other times in clusters, and occasionally have more than one apartment. Some of them are found near ancient oratories, and were therefore probably priests' dwellings, and certain groups are encircled by a stone wall for defense. They are assigned to various dates between the 7th and the 12th century.

Beelzebub, bē-ēl'zē-būb (Hebrew, "the god of flies"), a deity of the Moabites or Syrians. This term is applied in the Scriptures to the chief of the evil spirits (Matt. xii 24, Mark iii. 22, etc.). The correct form is probably Beelzebub, but in the Syriac and Vulgate the final letter is *b*. The alteration in that letter from *b* to *l* may have been due to euphonic reasons, or, as has also been maintained, *sebul* may have signified "dwelling" or "dung." In order to conceive how this name came to be given to one of the greatest of the imaginary spirits of evil it must be remembered what a terrible torment insects often are in the East. We find that almost all nations who believe in evil spirits represent them as the rulers of disgusting, tormenting, or poisonous animals—flies, rats, mice, reptiles, etc. The Greeks worshipped several of their chief deities under the character of protectors against these animals, for instance, Apollo Smintheus, the destroyer of rats. Christ was charged by the Jews with driving out demons by the power of Beelzebub (Matt. xii. 24). Compare 2 Kings i. 2.

Beer, bār, Adolf, Austrian historian: b. Prossnitz, Moravia, 27 Feb. 1831. His publications include: 'History of International Commerce' (1860-64); 'Holland and the Austrian War of Succession' (1871); 'The First Partition of Poland' (1873-4); 'The Austrian Commercial Policy in the Nineteenth Century' (1891).

Beer, Michael, German dramatist, brother of the composer Meyerbeer. b. Berlin, 1800; d. Munich, 22 March 1833. He became known to the literary world by five tragedies, of which his 'Struensee' is the best. His complete works were published at Leipzig in 1835, and his 'Correspondence' in 1837.

Beer, Wilhelm, German astronomer: brother of the preceding: b. 4 Feb. 1797; d. 27 March 1850. He was a Berlin banker, and in 1849 became a member of the Prussian Diet. His astronomical labors were associated with those of the astronomer, Madler. He built an observatory, chiefly devoted to the observation of the planet Mars and the moon. The crowning labor of the two astronomers was a map of the moon, published in 1836, upon which the

Lalande prize was conferred by the French academy.

Beer, bē'ēr. See ALE AND BEER; BREWING.

Beer-money, in the British army, a payment of one penny a day, formerly given to non-commissioned officers and soldiers when on home service, instead of a daily portion of beer and spirits. The custom was established in 1800, and abolished in 1873, when the stoppages for rations were also abolished.

Beere, bē'er, Mrs. Bernard (FANNY MARY WHITEHEAD), English actress: b. Norwich, England, 1859. She was the daughter of Wilby Whitehead and began her stage career in 1878 at the London Opera Comique. On her marriage she retired a short time from the stage, presently returning to it as Mrs. Bernard Beere, and her acting in 'Fedora' and 'Diplomacy' attracted much favorable comment. In 1892 she visited the United States professionally. In 1900 she married H. C. S. Olivier.

Beers, bē'erz, Ethel Lynn, American poet: b. Goshen, N. Y., 13 Jan. 1827; d. 10 Oct. 1879. She was the author of 'All Quiet Along the Potomac, and Other Poems' (1879), and was a descendant of John Eliot, the apostle to the Indians.

Beers, Henry Augustin, American author: b. Buffalo, N. Y., 2 July 1847. He graduated from Yale in 1859; became tutor there in 1871, and professor of English literature in 1880. He has published, among other works, 'A Century of American Literature' (1878); 'The Thankless Muse,' poems (1886); 'From Chaucer to Tennyson' (1890); 'Initial Studies in American Letters' (1892); 'A Suburban Pastoral, and Other Tales' (1894); 'The Ways of Yale' (1895); 'History of English Romanticism in the Eighteenth Century' (1899); 'History of English Romanticism in the Nineteenth Century' (1901).

Beers, Jan van, bārz, yān vān, Flemish poet: b. 22 Feb. 1821; d. 14 Nov. 1888. From 1860 he was professor at the Athenæum in Antwerp. His principal works, full of sentiment and melodious quality, are 'Youth's Dreams' (1853); 'Pictures of Life' (1858), and 'Sentiment and Life' (1869).

Beers, bē'erz, Nathan, American soldier: b. Stratford, Conn., 1753; d. New Haven, 10 Feb. 1849. While still quite young he went with his father to New Haven and was a member of a military company formed there in 1774, which was commanded by Benedict Arnold. Immediately on the receipt of the news of the battle of Lexington the company was called together by their captain, and Beers with 39 others volunteered to accompany him to the seat of war. They immediately set out, and, as they passed through Pomfret, were joined by Gen. Putnam. Beers received a lieutenant's commission in the army in 1777, and served until 1783. He afterward engaged in mercantile affairs, and in 1798 was chosen steward of Yale College, a position which he resigned in 1819.

Beers, William George, Canadian dentist: b. Montreal, 5 May 1843. He was educated in his native city, and having entered the dental profession, he founded the first dental journal in Canada, and remained its editor for several years. In 1900 he was editor of 'The Dominion Dental Journal' (Toronto), and dean of the

BEERSHEBA—BEET SUGAR

Provincial Dental College, as well as professor of dental pathology, therapeutics, and materia medica in McGill University. He wrote the first book on the game of lacrosse, and is regarded as its originator. He organized and captained the first lacrosse team that visited England in 1876, and also the second one in 1883. He is noted as a lecturer and public speaker, and since 1862 has been a constant contributor to the principal American magazines.

Beersheba, bē-er-shē'ba (now BIR-ES-SEBA, "the well of the oath"), the place where Abraham made a covenant with Abimelech, and in common speech representative of the southernmost limit of Palestine, near which it is situated. It is now a mere heap of ruins near several wells, though it was a place of some importance down to the period of the Crusades.

Beeswax, a solid fatty substance secreted by bees, and containing in its purified state three chemical principles—myricin, cerin, and cerolein. It is not collected from plants, but elaborated from saccharine food in the body of the bee. It is used for the manufacture of candles, for modeling, and in many minor processes.

Beet (AS. bete; Lat. *beta*), a plant of the genus *Beta*, natural order *Chenopodiaceæ*. There are several species, mostly biennials, with stalked, smooth, ovate leaves, with flowers borne on tall leafy stems. *B. vulgaris* is generally recognized as the only species of economic importance; the slender-rooted variety, or sea-beet, is found growing wild in sandy soil, near the sea, in Europe and western Asia. De Candolle regarded it as the original type. It has been in cultivation since 200–300 B.C., and to-day the numerous varieties may be classified under one of five sections, although the divisions are arbitrary and of no great importance.

Garden Beets—These usually have small tops, with turnip-shaped to tapering roots of medium size, fine-grained, smooth, regular, generally red but sometimes yellowish or whitish in color. Among popular varieties are Early Blood, Eclipse, Bassano, and Egyptian turnip. The soil best suited is a loose, rich, deep, clean, well-tilled loam. Well-rotted barnyard manure with some potassic fertilizer is often applied. Seed is sown as soon as possible in the spring, for the early crop, with other sowings until June to ensure a succession; in rows, varying from one foot apart, where intensive gardening is practised, to three feet where horse labor is used. The plants are thinned from four to six inches asunder in the rows, care being taken to leave only one plant in a place. Thinning is often done when the young plants are large enough to sell as "greens." The late crop, if required for winter use, must be stored before frost. Beets are sometimes forced under glass.

Mangold Wurzels or **Mangels** are a large, coarse form raised for cattle-feeding. Standard varieties include Mammoth long red, Golden tankard, and Globe. Seed is sown as early as possible in the spring, in rows two to three feet apart, and the plants allowed to stand 12 to 16 inches asunder in the row. To ensure a good crop the land must be in a high state of cultivation and well supplied with plant-food. They may be grown on alkali soils.

Sugar-Beets.—The varieties are rather small-growing, and nearly always yellowish or whitish in color. They contain a high percentage of

sugar, which has been increased by selection and cultivation. They are extensively grown in Europe and in the northern and western States.

Chard or **Swiss Beets** have comparatively large leaves with succulent leaf-stems, which are cooked and eaten like asparagus. See CHARD.

Foliage Beets are grown for ornamental purposes. The luxuriant foliage is of many colors and varied in markings. Brazilian, Chilean, Victoria, and Dracena-leaved are well-known varieties. They may be raised from seed, like other beets, and the roots lifted in fall and kept over winter.

Uses and Feeding Value.—As a vegetable the root of the garden beet is boiled, pickled, and used as a salad; and the tops are boiled as "greens." The contain on an average 88.5 per cent water; 1.5 per cent protein; 8 per cent nitrogen-free extract, 1 per cent ash; 0.1 per cent ether extract, and 0.9 per cent crude fibre. Mangels are fed to cattle, they contain from 7 per cent to 15 per cent dry matter, of which about 88 per cent is digestible; an average percentage composition may be taken as: water, 90.9; protein, 1.4; nitrogen-free extract, 5.5; ether extract, 0.2; ash, 1.1, crude fibre, 0.9. About 77 per cent of the protein or 96 per cent of the nitrogen-free extract is digestible. The dry matter of mangels and corn silage are of about equal value for feeding, but as the cost of production in mangels is double that in corn, stockmen in the United States have not paid much attention to them.

Enemies—Beets are sometimes injured by the beet-fly, otherwise they have few insect enemies. They are sometimes attacked by rust, rot, leaf-spot, and scab. Spraying with Bordeaux mixture will prevent the leaf diseases. Scab attacks the root, and as it also attacks the potato these crops should not be grown in succession.

Beet pulp is a by-product of sugar-beet factories, consisting of sliced sugar-beets after the sugar is removed. It contains about 10 per cent dry matter, the remainder being water, and in the wet condition must be fed at once or held in silos. It may be fed to milch cows, fattening steers, and sheep, and ranges in value from half to two thirds the value of corn silage. Some of the factories have erected sheds and feed large quantities of it to stock with the addition of hay and grain.

SAMUEL FRASER,
Instructor in Agronomy, Cornell University.

Beet Sugar, the sugar obtained from the beet, similar to cane sugar; but inferior in sweetening power. The discovery of sugar in the beet was made by a German chemist, Margraff, as early as 1747. No practical results followed his discovery, however, as the cost of obtaining sugar from the beet by laboratory methods was too high as compared with that of cane sugar. Little progress was accomplished until about 50 years later, when another German chemist, Achard, succeeded in extracting sugar from the beet root on a comparatively large scale. In 1812 a manufactory was in operation in Silesia, in which, under Achard's direction, about 20 quintals of beets were worked up daily, and about five pounds of raw sugar extracted from every quintal. The high price of sugar prevailing at that time all over the European continent by reason of the blockade, and the great interest and favorable attitude taken by the different continental governments toward the new experiment, caused

BEET-SUGAR INDUSTRY

it to be a success for a short time. Napoleon issued an imperial decree in the early part of his reign, establishing this industry in France, and in 1812 he ordered the building of 10 factories and placed Delessert in charge of their construction. In 1830 attempts were made in the United States to introduce the cultivation of the sugar-beet. It was not, however, till 1876 that the first successful beet-sugar factory was built, being erected in Alvarado, Cal., since when the production of beet sugar in the United States has increased by leaps and bounds.

Beet-sugar Industry, The. The production of sugar-beets and of beet sugar in the United States is now assuming such proportions that, with the increase of factories and the marked popular interest, it has become one of the leading subjects demanding consideration from agriculturists. There is probably no other industry in this country that has developed so rapidly and now absorbs so large a share of public attention as that of beet sugar.

Attempts were made to establish the industry in Massachusetts in 1841. There were also efforts in this direction in Illinois, Wisconsin, and California between 1863 and 1876, and much was claimed for the industry at this time by newspaper writers, capitalists, and leading farmers. In California, after a long period of unprofitable production, it achieved its first success. The failure of these early attempts seems now very natural as we look back over the history of agricultural progress in the United States. The beet-sugar industry belongs to the domain of agriculture, and the problems it presents are agricultural. These early efforts were simply ahead of their time in the course of agricultural development, and they failed in the establishment of the beet-sugar industry for want of the proper methods of farming and the proper conditions underlying the farming industry.

At the time of the first attempts at sugar-beet production, agriculture comprehended simply the primary features. Its products were confined mainly to cereals, forage crops, and live stock, and the production and marketing of raw materials was its main object. The farmer in those early days did not concern himself with enterprises dependent on the concentration of efforts in the production of finished products. Land could be purchased for a few dollars per acre. If the prospective farmer did not have the money to buy the land he could enter a claim on Government land. His whole ambition was to produce something quickly and pay for the lands and primary improvements. This was accomplished by raising corn, wheat, oats, cattle, and hogs. The open public domain offered a free pasture. Gradually the eastern sections became more densely settled, and farm lands became more expensive. Crude production was accomplished more cheaply by the Western farmer. Later, owing to development of transportation facilities, the agriculture of this country had to compete with the cheap labor of Europe. The colonial extension of European countries brought areas into competition with American farms in turning out crude products, and with labor much cheaper even than that of Europe. The problem became, how to turn crude material into something that would represent not merely the labor but the skill and ingenuity of the American people, thus supplying our own markets and those of the world with finished products. The American farmers

found, as the manufacturers had found before them, that their success depended upon the superior skill and artisan ability of Americans as compared with Europeans and their colonists. "Necessity is the mother of invention," and demand and necessity united in the evolution of a new system. This began in the East, working westward, in the production of butter, cheese, prepared meats, flour, eggs, poultry, etc. Later came the establishment of other industries, working up crude products of the farm into finished articles. We became producers of syrups, canned vegetables, canned fruits, etc., until manufacturing reinforced farming from ocean to ocean. When all this was accomplished, the time was ripe for the success of the beet-sugar industry.

Industrial Features—It is one of the marked features of American industrial life that the people as a mass have always shown a readiness to forego immediate benefits, and, even at considerable expense to themselves, to encourage industrial development. As a result this country has made a record among the nations of the earth unparalleled in rapid development, accumulation of wealth, and hold on the trade of the world.

One of the chief items of cost in the production of anything is labor. In this country it is contended that the laborer is not only entitled to earn a living, but to live comfortably, to be able to educate his family, and to acquire a comfortable home. There is no position in life, social, financial, or political, to which the laboring man may not aspire. While this means much for the citizen, it adds materially to the cost of production. This country to-day is the concern of the nations of the earth in being able to maintain a balance of trade in its favor through its agricultural and industrial productions, and this balance is constantly increasing. The sugar industry is supported by American enterprise and spirit, and under this American policy it is rapidly assuming a prominent position in the long list of successful industries.

There are two sides to the proposition of establishing a sugar factory in any particular community: (1) That of the farmer, involving agricultural conditions; and (2) that of the manufacturer or those financially interested in the enterprise.

Problems for the Farmer.—The leading difficulties of the farmer may first be noticed. To begin with, he is unacquainted with the methods of cultivating the sugar-beet plant, and his first experience usually proves unsatisfactory. He is accustomed to certain methods in farming. As a rule he is conservative, and thinks, from his long experience in farming, that he knows how to farm. He undertakes to apply methods successful in the cultivation and production of other crops. He is not inclined to listen to those who are posted in methods applicable to the new crop. Eventually he finds out his mistake. He finds that in growing sugar-beets he must apply principles, in many cases, the reverse of those necessary to other crops. For instance, he has been accustomed to growing large ears of corn, large hogs, and large steers; but in the case of sugar-beets he finds that the first question is not one of size, but of quality. He must grow beets of a certain size, purity, and sugar content. In order to accomplish this he must give careful attention to the work of preparing the land,

BEET-SUGAR INDUSTRY

planting the seed, bunching, thinning, and cultivating. He finds that attention to details counts in results at the harvest in the profits on the crop. He learns that the whole process is a very laborious and expensive one, entirely unlike anything he has attempted before. To be successful he must apply the methods of the gardener to a field crop. He must have a rich soil, and the proper rain conditions at the proper time. These facts can only be learned through experience.

The Question of Labor.—The labor problem is important in the cultivation of sugar-beets. At certain stages of their growth they require a considerable amount of labor. This labor is very tiresome. As a rule, the farmer, if he grows beets to any extent, does not have on his farm sufficient labor to do the work of thinning and bunching, hoeing, and harvesting the sugar-beets; nor does any farming community possess to any considerable extent the labor necessary to grow the beets that a factory will require in a campaign. It will cost about \$30 an acre in sections where sugar-beets are grown under rainy conditions, and about \$40 to \$45 an acre in sections where beets are grown by irrigation, to cover the cost of seed, preparation of seed-bed, bunching and thinning, hoeing, cultivating, harvesting, and delivering to the factory. These estimates apply to growing sugar-beets when it is properly done. In the farming communities of foreign countries, as a rule, a large amount of suitable labor can be secured in the neighborhood, because these neighborhoods are more thickly settled; the whole population is willing to do the laborious, tedious work required, and whole families work at it, including the father, mother, and children. In this country, as a rule, the farmer, his older sons, and hired hands must attend to the outdoor work. It has been found necessary for sugar-beet growers to resort to the cities and towns for the extra labor required. Most of this work comes about the time the public schools are closed, and boys from 12 years up are employed for bunching and thinning the beets, for hoeing them during the season, and to aid in the harvesting by pulling, cleaving the tops, and loading the beets into wagons. In the cities also live many foreigners from Holland, Russia, Sweden, and other places, who are thoroughly familiar with this kind of work. These people are willing to move out into the fields and live in tents; they make contracts at so much per acre for bunching and thinning, hoeing, weeding, and harvesting. Since the agitation and starting of the beet-sugar industry in this country, foreigners are coming here with a view to securing employment of this kind. While the labor question is a serious one, it is one capable of solution by careful and detailed attention.

Problems for the Manufacturer.—The manufacturer or the capitalist who builds a factory finds that he has even more problems to work out than the farmer, and, like the farmer, he usually discovers that he is entering a field that is entirely new to him. Before establishing his plant the prospective manufacturer must thoroughly investigate certain conditions: (1) The water supply, for he must have an abundant supply of pure water for the use of the factory. (2) The fuel supply, as the factory must be located in a section where cheap fuel can be secured (the fuel usually used is coal, but on the Pacific coast petroleum is used to a large extent,

and in some of the mountain States it is found that wood is the cheapest fuel). (3) A market for the product (this factor should be thoroughly canvassed and settled prior to establishing a factory; the fact that the manufacturer is proposing to establish a factory on a particular line of railroad can generally be used to secure by contract low freight rates for the future in shipping both beets and the finished product—sugar). (4) The supply of lime (the local quarries of lime rock must be investigated to see if the quality is suitable and the supply sufficient, as a large amount will be required).

The general conditions having been found satisfactory, and the factory being built, other problems arise. In the beginning only a limited amount of skilled labor is employed. Eventually every employee of the factory will become skilled in his particular part. After two or three campaigns have passed the factory will have worked out the details of producing the best product at the least cost with the machinery which it has. When this point shall have been reached those interested will be prepared to estimate the cost of production of beet sugar. The difference in cost of production at a new factory and at one operated for a considerable time is much greater than one unacquainted with the subject would suppose.

Statistics of the Industry.—The recent census shows the rapid growth of the beet-sugar industry in this country. Thirty-one factories had been established before the end of the century. Since that time 11 other factories have been put in operation, located at the following places, and having the daily capacities named: Lyons, N. Y., 600 tons; Rockyford, Col., 1,000 tons; Sugar City, Col., 500 tons; Bingham Junction, Utah, 350 tons; Provo, Utah, 350 tons; Lansing, Mich., 600 tons; Saginaw, Mich., 600 tons; Salzbürg, Mich., 400 tons; Loveland, Col., 1,000 tons; Menomonee Falls, Wis., 500 tons; and Logan, Utah, 400 tons.

At the following places factories are either in process of erection or preparations have been made for building in 1902: Sebewaing, Mich., 600 tons; Carrollton, Mich., 600 tons; Mount Clemens, Mich., 600 tons; Crosswell, Mich., 600 tons; Greeley, Col., 800 tons; Eaton, Col., 500 tons; Fort Collins, Col., 500 tons.

At the following places companies have been organized and capitalized, and there is every indication that they will mature their plans and erect factories in time to engage in the beet-sugar campaign of 1902 or 1903: Saginaw, Mich., two factories, 500 tons each; Chesaning, Badaxe, Grand Rapids, and Lapeer, Mich.; Sioux City, Iowa; Longmont, and Lamar, Col.; Bear River Valley, Utah; Phoenix, Ariz.; Cheyenne, Wyo.; Los Angeles, Cal.

At many other places preliminary organizations have been formed which are only awaiting developments assuring more settled conditions affecting the sugar industry.

Methods of Growing Sugar-Beets.—It would be quite difficult to give general directions and rules for growing sugar-beets applicable to all localities and conditions. Often expert sugar-beet growers, at public meetings and in the agricultural press, give minute directions covering all the details of this intricate process. Others, each well versed in the process of growing sugar-beets, get into arguments and disputes as to the right method. In such cases each

BEET-SUGAR INDUSTRY

may be correct in a measure. The occasion for such disagreements lies in the fact that each person has in mind the right method for a particular locality or set of conditions. A careful study of the different sections of the United States where sugar-beets are grown will lead to the conclusion that there is no single road to success in growing sugar-beets. Every locality has settled conditions which will materially modify any set of methods that might apply to some other one. There are some settled rules, of course, but it is an actual fact that the various agricultural districts of this country will have to work out each for itself the right method. The person who argues that the ground must be plowed in the fall in order to receive the benefit of winter frosts is not offering any argument to the Pacific coast, for instance, where many beets are grown, and he who insists that the ground should be rolled in all instances after planting will hazard the crop if his directions are followed in many parts of Nebraska and other sections where the soil is sandy and there are strong winds. In such cases a smooth surface offers an excellent opportunity for the wind to carry along the sharp grains of sand, cutting off the plants and destroying the crop.

There can be no general fixed rules applying to the kinds and application of fertilizers. General principles are all right when accompanied with the underlying reasons, but they must always be modified to meet local conditions.

With the development of the industry in all the sections which have the necessary conditions, and the acquirement of ample experience both by the farmers in the production of beets and by manufacturers in the making of sugar, there will come many improvements, and eventually a cheapening of production, a result of great importance to all concerned in the success of the industry, because eventually the beet-sugar industry in the United States will have to meet a sharper competition with foreign sugar producers.

There are some things settled, however, about growing sugar-beets. It will generally be conceded that the ground should be plowed deep, and in most instances subsoiled. Before the seed is planted, the ground must be thoroughly pulverized by harrowing and by rolling, even if the surface has to be afterward roughened. Advantage must be taken of the general and prevalent rain conditions. The ground must be moist enough to germinate the seed, either by rainfall or irrigation. Rainfall is best when it can be obtained. In some localities either is used, according to circumstances. Seeds are planted at depths of from half an inch to two inches, according to the prevailing conditions in the particular locality. The beets must be planted near enough together to produce a beet of a certain size. This spacing depends, again, upon the locality and the nature and fertility of the soil. The size and quality of the beet depend materially on the right kind of spacing. The beets must be thoroughly cultivated, hoed, and hand-weeded, because cultivation tends to conserve the moisture of the soil, and clean fields permit favorable action of sun and air. This close cultivation should be kept up until the beet tops thoroughly shade the ground and reach a size when it would be injurious to operate among them further with a

plow and hoe. The beets should be harvested as soon as possible after they are ripe, because then they contain the most sugar and the highest purity. It is evident that the entire crop of beets in the neighborhood of a factory cannot be harvested at once. In many localities some will have to be siloed. Harvesting-time will depend a great deal upon circumstances connected with the operation of the factory. The sooner the beet is harvested after it is ripe the better, because further rainfall may start a new growth, producing new lateral roots and new leaves, thus greatly reducing the sugar content and purity of the beets.

Benefits to the Farmer.—No statement of facts with reference to any new crop would be complete or would indicate the advisability of its introduction unless it showed the benefits to be derived. Of course, profit and loss in any enterprise is the first consideration.

It has already been stated that it costs about \$30 per acre to produce sugar-beets and to market the crop where rain conditions prevail. This is without taking into consideration the rent of the land, but it includes the farmer's time and everything else that enters into the cost of production. The average yield is about 12 tons per acre. Probably this cost of production will be gradually reduced because of improvements in implements and methods. The beets grown have a gross value at the factories of \$4 to \$4.50 per ton (in States paying no bounty). This gives a gross return per acre of \$48 to \$54, and a net profit of \$18 to \$24. It must be kept in mind that these are averages of gross and net proceeds. It is never very encouraging to consult the average of agricultural crop statistics; indeed, it is often said that "the average crop does not pay." If one should take the figures of the average crop of corn in Iowa, for instance, or the average crop of wheat in Minnesota or Kansas, and compute the proceeds at the average market price, and deduct therefrom the cost of production, the results would show a very small remuneration or an actual loss, quite discouraging to one who has not investigated this subject.

Taking what seem to be the most authentic figures, the cost of producing sugar-beets in sections where they are grown by irrigation is about \$40 per acre. An average of 13 tons per acre can be produced, having a higher sugar content, and worth \$4.50 to \$5 per ton, making the gross proceeds \$58.50 to \$65, and the net profit \$18.50 to \$25 per acre. These figures give to the farmer in each case a profit greatly more satisfactory than in the case of other crops. But the successful farmer will never be satisfied with the average proceeds of any crop, and it is to him we must look for the results that give the more encouraging inducements to beet culture. Many growers receive as high as \$75 and some as high as \$100 per acre for their beets, these high results depending upon the superior quality of the land and the superior skill of the one producing the beets. If a farmer has poor land or is a poor farmer, he is not in a position to expect much in planting any kind of crop. These statements are sufficient to give a farmer who is experienced in all other kinds of crops a fair insight into the situation.

There are indirect benefits in sugar-beet growing that the farmer must take into consideration, along with the direct, as follows: He

BEET-SUGAR INDUSTRY

learns that sugar-beets are a very valuable crop to grow for his stock. It is estimated that they are worth two thirds as much for feeding as for production of sugar. They may enter into a food ration for any kind of stock. The farmer growing beets for a sugar factory retains for feeding the beets that have been "docked," or that are liable to be. He constructs root-cellars and stores them away, and they enter largely into all animal food rations for winter feeding. For stock-feeding sugar-beets have both a nutritive and a sanitary value.

The high cultivation that must be given to the land through deep plowing, thorough harrowing, and constant weeding and cultivating finally makes the land of superior quality for any purpose. It will grow better corn or wheat, and at a less expense, on account of the absence of weeds and grass. Finally, through rotation, other fields are brought under this high state of cultivation, until the whole farm is at its best condition of soil fertility and productivity.

The method that has brought this about serves as an object-lesson to the farmer and the farming neighborhood. A better cultivation will prevail, and the science of farming will become several degrees higher on account of experience in sugar-beet cultivation.

After the beets are delivered to the factory, and the sugar has been extracted, it is found that the pulp (which will amount to 50 per cent in weight of the beets worked) is almost as valuable for feeding purposes as the original beets themselves. It is a very cheap feed and sells for 35 to 50 cents per ton. It enters naturally and profitably into the food rations of all kinds of stock. It is especially valuable for steers, lambs, brood mares, and brood sows, but reaches its highest use as animal food when fed to the dairy cow. The farmers in the neighborhood of a beet-sugar factory feed large quantities of it. They appreciate its nutritive and sanitary value. Pulp feeding gives an impetus to animal industry of all kinds. It offers a stimulus to the establishment of butter and cheese factories, to the erection of feeding-pens, and to the whole stock-feeding industry. Its use is one of the strong reasons for establishing the industry.

The beet-sugar industry opens up at once a large demand for labor, not only in the factory itself, but on the farm. It is one of the things in which the farmer can invest with the assurance that he has a sure market and a fixed price for his crop to begin with.

Benefits to Other Industries.—The establishment of a beet-sugar factory opens up not only a large field for the employment of labor, but also a field for the employment of capital. It becomes at once a market for considerable crude material to be used in conducting the business. First and most important it furnishes a market for the beets. Then the factory is a large consumer of coal, and as the factories are often established in communities having local coal fields they become at once local markets for a local product. The amount of coal necessary to work up a certain amount of beets is generally computed at about 17 per cent by weight, or, in case of an ordinary factory of 350 tons capacity, about 60 tons of coal per day, or 6,000 tons for a full campaign of 100 days. A

factory also consumes a large amount of lime rock, which of necessity must also be a local product. It usually consumes lime rock to the extent of about 10 per cent of the crude weight of beets worked, which in the case of a 350-ton factory would be 35 tons of lime rock per day, or 3,500 tons for the campaign. It consumes about one fifth as much coke as lime, or a little less than 700 tons during a campaign.

The establishment of a factory in a community necessitates considerable transportation of crude products—beets, coal, and lime rock—to the factory, and in carrying the finished product to the market. It stimulates banking and almost all kinds of mercantile business throughout the community.

The Future of the Industry.—The following figures will give an idea of the possibilities for the expansion of the beet-sugar industry in the United States:

CONSUMPTION, PRODUCTION, AND IMPORTATION OF SUGAR

	TONS.
For 1901 the total consumption of sugar in the United States	2,372,000
Adding to this the average yearly increase, based on an estimate for twenty years, the consumption of sugar for 1902 will be....	2,478,000
To meet annual requirements there must be imported into the United States proper this 2,478,000 tons, less what this country manufactures. The home production for 1902 should be about as follows	
Cane sugar of the South	300,000
Beet sugar of the North and West	185,000
	485,000
Balance imported	1,993,000
Requirements from outside for 1902 will be in round numbers	2,000,000
Of this amount from insular possessions, free of duty, there will be received—	
From Porto Rico about	100,000
From Hawaii about.....	300,000
	400,000
There must be secured from strictly foreign sources, duty paid.....	1,600,000

It is the ambition of those encouraging the beet-sugar industry to establish factories enough at least to furnish this foreign importation. Making due allowance for failure of factories to reach in actual production their full capacity under ideal conditions, it would require 500 factories having a daily capacity of 500 tons of beets to produce the sugar imported, or a sufficient number of cane-sugar factories to produce an equal amount of sugar. As a matter of fact, there is likely to be a rapid increase in both beet-sugar and cane-sugar factories. But for convenience the calculations here made are based on the supposition that the increase will be in beet-sugar factories only. In order to equip and build these factories it will require an investment of capital of \$250,000,000. This vast sum of money must be expended in this country for building materials and machinery and in the employment of the labor necessary to construct and equip the factories. The annual requirements of these factories will be as follows:

ANNUAL REQUIREMENTS OF 500 BEET-SUGAR FACTORIES.

They will require of beets.....tons.	18,750,000
pay farmers for the beets..	\$84,375,000
require of coal.....tons..	3,187,500
pay the coal-dealers.....	\$ 9,562,500
require of lime rock.....tons..	1,875,000
pay to the quarries for lime rock.\$	3,750,000

BEETHOVEN

They will require of coke.....tons... 375,000
pay to the coke-dealers for coke...\$ 3,000,000
expend for labor in the factories.\$19,000,000

In addition to the foregoing list large amounts of money will be paid for mill supplies, transportation, etc. As working capital to operate these factories \$135,000,000 will be required. This sum being in use, however, for about four months in the year, the interest charged thereon is equal to an interest charge on \$45,000,000 for one year. It should be remembered that the above estimates do not include the capital already invested in the business and the operations of the factories already built, the statement of which is as follows.

PRESENT DEVELOPMENT OF THE BEET-SUGAR INDUSTRY.

Capital invested in factories, equipment, and grounds.....	\$30,000,000
Beets purchased annually.....tons...	1,875,000
Cash paid for beets purchased annually.....	\$ 8,437,500
Coal consumed annually.....tons.....	318,750
Cash paid for coal annually.....	\$ 956,250
Lime rock purchased annually.....tons...	187,500
Cash paid for lime rock annually.....	\$ 375,000
Coke purchased annually.....tons.....	37,500
Cash paid for coke annually.....	\$ 300,000
Cash paid for labor annually.....	\$ 1,900,000
Operating capital annually employed.....	\$ 5,000,000

Also there is a considerable amount annually expended for crude material and various other things. It hardly seems possible that an industry which affects so many people over such a wide scope of country can fail to receive anything but the most friendly, careful, and fostering consideration on the part of those who shape industrial affairs.

The immensity of future demands, it seems, answers effectually those who feel that the industry might be overdone. Attention should be called to the fact that not only are present demands great, but that the rate of increase of consumption is considerable. According to careful statistics for the last 19 years, consumption of sugar in this country has been increasing at the average rate of about 6½ per cent annually.

CHARLES F. SAYLOR.

Beethoven, Ludwig Van, the greatest orchestral composer of the 19th century. b Bonn 16 Dec. 1770, d Vienna 26 March 1827. While classed among the German masters, the Dutch Van in his name (which is not a sign of nobility) indicates his descent from a family in the Netherlands, the world's musical centre in the 15th and 16th centuries. This family moved in 1650 from Louvain to Antwerp. Beethoven's grandfather was a bass singer and a conductor; his father was a tenor, who did not lead an exemplary life; his income was only \$150 a year, wherefore it is not surprising that he eagerly availed himself of his son's musical talent and exploited it. He personally taught Ludwig to play the violin and the clavier, in the hope of making of him a "wonder-child" like Mozart. While Ludwig was not remarkably precocious (he even shed tears over his music lessons), he is said to have written a funeral cantata at 11, and in the same year was taken on a concert-tour by his father, who, to make his performances seem more remarkable, represented him as being two years younger. Before he had reached his 12th year the organist Neefe spoke of him as "playing with force and finish, reading well at sight, and, to sum up all, playing the greater part of Bach's 'Well Tempered Clavier,' a feat

which will be understood by the initiated. If he goes on as he began, he will certainly become a second Mozart."

Mozart himself appears to have been of this opinion, for when he heard young Beethoven improvise in Vienna he exclaimed to the bystanders, "Keep your eyes on him! He will give the world something to talk about!" This was in 1787. Beethoven had been sent to Vienna in the hope that he might be able to take lessons of Mozart, apparently he did take a few, but the illness of his mother made him hasten back to Bonn. Although Bonn was a small town, it had quite a musical atmosphere, and Beethoven had good opportunities to become acquainted with the operas and the concert pieces then in vogue. He was only 13 when he got a position as assistant court organist, and subsequently he played the pianoforte accompaniments at the rehearsals of the opera orchestra. He also played the viola. His first salaried position (\$63 a year) was as assistant organist under Reicha. The most important occurrence of the Bonn period was the formation of an intimate friendship with Count von Waldstein, to whom he subsequently dedicated one of his best sonatas. The Count had promptly recognized his genius, and it was probably owing to his suggestion that the elector of Cologne, Max Franz, decided to provide the young musician with the means for going to Vienna again and there continuing his studies with Haydn, to whom Beethoven had already been introduced when Haydn stopped at Bonn, in 1790, on his way to London. It was in November, 1792, nearly a year after Mozart's death, that Beethoven entered Vienna, which was to remain his home till the end of his life. The lessons from Haydn were duly arranged for and the first was given in Haydn's house on Dec. 12, the payment being eight groschen (about 20 cents). But Haydn, like most creators, was not a good teacher and although Beethoven took lessons of him more than a year, he soon began to take his exercises for correction to Schenk before showing them to Haydn. He subsequently took lessons of the pedantic contrapuntist Albrechtsberger, who, however, complained that his pupil was unwilling to "do anything in decent style" and had too little respect for rules—this last being a peculiarity which he, fortunately, soon began to manifest in his compositions. To these compositions he was so lucky as to be able to devote nearly all his time. From his father he received no pecuniary assistance, but there were several sources of income. Prince Lichnowsky gave him an annual stipend of 600 florins, and when, in 1809, an attempt was made to entice him to Kassel, where a position as Kapellmeister was offered him, some of his princely friends gave him an additional annuity of 4,000 florins, to chain him to Vienna. This lasted only till 1811, but at this time he was already deriving a considerable income from the sale of his works. Many of his letters show that he knew how to make a good bargain. Had it not been for a spendthrift nephew, of whom he was very fond, and for whom it was found at the time of his death he had even placed 7,000 florins in the bank, he would have never suffered any financial tribulations such as Mozart and Schubert had to endure all their lives.

BEETHOVEN

It was fortunate that the Kassel offer was refused, and that an earlier attempt (in 1796) to win him for Berlin had also led to naught; for Vienna was the proper place for Beethoven. It was at that time the world's musical centre, owing largely to the unusual interest taken in music by the aristocratic circles. To understand the significance of this fact we must bear in mind that at that time there were few public concerts; it was the nobility who maintained the orchestras and patronized the great artists, the audiences being invited guests. Beethoven brought with him from Bonn letters of introduction to leading members of the aristocracy, and thus found himself at once "in the swim." He had not yet done anything very remarkable as a composer and was at first admired chiefly for his improvisations on the pianoforte; but gradually a sense of his greatness dawned on his patrons, who bore patiently all his eccentricities. While recognizing the advantage of being intimate in the houses of the aristocracy, he never truckled to rank and refused to submit to the intricate and artificial rules of court etiquette. At the same time he expected the aristocrats to behave like ladies and gentlemen; one day when a young man talked loudly while he was playing, he suddenly stopped and exclaimed, "I play no longer for such hogs." His attitude toward wealth is illustrated by his once sending back his brother's card on which "Johann van Beethoven, land proprietor" was printed, after writing on the back: "Ludwig van Beethoven, brain proprietor."

In the homes of some of his aristocratic friends he gave lessons to the women and girls. He did this unwillingly, looking at the time thus spent as filched from his compositions. He often failed to keep his appointments and was apt to be irascible and bearish; but his fair pupils were only too glad to put up with all this for the sake of the benefit they got from his lessons. He was, at the same time, a great admirer of women and often in love, although none of his infatuations appear to have lasted more than seven months. He was never married, for although he repeatedly proposed he was each time refused. These love affairs call for mention because they had an influence on not a few of his compositions. A well-regulated household was a blessing he greatly needed. His eccentric habits were forever forcing him to change his lodgings and he seldom could keep a servant longer than a few weeks. If his cook brought him a bad egg he threw it at her. He often got angry when the servants laughed at the sight he presented while composing—tossing his hands about, beating time with his feet, and singing or rather, growling. His rooms presented scenes of great disorder. His gastronomic habits were unwise, and the dyspepsia they gave rise to was responsible for much melancholy and for many of the outbreaks of ill-temper for which he became notorious as he grew older. While naturally of an affectionate disposition (as instanced in his fondness for his nephew) and always fond of jokes, he would, on occasion, insult and abuse his best friends on slight provocation; but these outbursts of irascibility were usually followed by the most abject apologies. He was, in short, like his music, highly emotional and regardless of rules.

The chief cause of his growing moroseness and irritability was the difficulty of hearing which began in 1798 and gradually ended in complete deafness. In 1802 (25 years before his death) he wrote in his last will: "O ye, who consider or declare me to be hostile, obstinate, or misanthropic, what injustice ye do me! Ye know not the secret causes of that which to you wears such an appearance"; and he proceeds to speak of his hearing, which had been growing more and more defective for six years, and which made him "un people, as he did not wish to say constantly: "Speak louder—bawl—for I am deaf." His last appearance in public in concerted music was in 1814. Two years later he began to experiment with ear-trumpets, his collection of which is now in the Royal Library of Berlin. His attempts to conduct after this usually led to mortifying and pathetic scenes. The last was in 1824, when, although totally deaf, he insisted on conducting his ninth symphony; he could not even hear the applause which followed it. All communication with him was, in the last years of his life, carried on with the aid of pencil and paper. The autopsy showed that not only were the auditory nerves practically paralyzed, but there were other advanced troubles (the liver was tough as leather and shrunk to half its normal size), which made it remarkable that he should have retained his vitality so long. The immediate causes of death were inflammation of the lungs and dropsy. A week before his death he was still busy with letters and with plans for new compositions, including a tenth symphony, a requiem, and music to Faust. He died during a violent thunder and hail storm, about six o'clock on March 26, 1827. The Viennese, who had been neglecting him during the last few years, because of the Rossini furor (in 1823 no operas but Rossini's were sung in Vienna, and the whole musical atmosphere was affected by them), now realized their loss and a crowd of 20,000 persons attended the funeral. He was buried in the Währinger Friedhof, but in 1888 his remains were transferred, with those of Schubert, to the Central Cemetery. Statues of him were erected at Bonn in 1845, in Vienna in 1880, in Brooklyn in 1894, at Leipzig (Max Klinger) in 1902. In 1815 the freedom of the city of Vienna had been conferred upon him.

A certain wildness was given to Beethoven's appearance by his long, abundant hair, which was always in a state of disorder. He was strongly built and muscular, but below medium stature, his height being five feet five inches. His small black eyes were bright and piercing, his forehead broad and high, his complexion ruddy. His friend Schindler wrote that when a musical idea took possession of his mind, "there was an air of inspiration and dignity in his aspect; and his diminutive figure seemed to tower to the gigantic proportions of his mind." Already in Bonn his friends used to note the occasions when he was "in his raptus." These moments of inspiration would come to him at any time and anywhere—in his room, in the streets of Vienna, and particularly in the country. He was extremely fond of nature and country life, and spent his summers in the picturesque regions near Vienna. A sketch



BEETHOVEN.

BEETHOVEN

book was always in his pocket, and into this he jotted his ideas as they came. Afterward he revised and re-revised these sketches. "There is hardly a bar in his music," says Grove, "of which it may not be said with confidence that it has been rewritten a dozen times. Of the air 'O Hoffnung,' in 'Fidelio,' the sketch books show 18 attempts, and of the concluding chorus 10." These sketches have been collected by Nottebohm and printed; they give an interesting and instructive insight into the workshop of genius. Another curious fact regarding his creative power is that like Wagner's, it matured slowly. Mendelssohn wrote his best piece, the 'Midsummer Night's Dream' overture at the age of 17; Schubert was 18 when he wrote his wonderful 'Erlking'; but Wagner was 28 when he wrote his first really original opera ('The Flying Dutchman'), and Beethoven 29 when he composed his first symphony, and that might have been almost as well written by Mozart or Haydn.

It is customary to divide Beethoven's compositions into three groups, following the suggestions of a Russian, W. von Lenz, who, in 1852, issued a book entitled 'Beethoven et ses trois styles.' The first group, in which the influence of his predecessors is still more or less obvious, includes, among many other things, the first two symphonies, the septet, the first six string quartets, the aria 'Ah perfido' the song 'Adelaide,' etc.; the second, which shows Beethoven in the full vigor of his manhood, originality and creative power, begins after the year 1800, and includes six symphonies, from the third (Eroica) to the eighth, the opera 'Fidelio,' the violin concerto, the Coriolan overture, the Egmont music, the Rasumovsky quartets, the Kreutzer sonata, the 'cello sonata in A, 14 sonatas for pianoforte, etc.; the third, which begins after a period of great tribulation and depression in his life, includes the last five pianoforte sonatas, the string quartets op. 127, 130, 131, 132, 135, the 'Missa solennis,' the ninth symphony, the 'Ruins of Athens,' etc. Concerning some, at least, of the works of this third period opinion is still divided. There are critics who think that, partly in consequence of his deafness, Beethoven had become garrulous, incoherent, and vague, whereas others profess to find in the compositions of this period the highest summit of all musical creativeness.

A better way than Lenz's of considering the achievements of Beethoven's genius is to cast a glance at each class of his compositions by itself. The eminent English critic, Dr. Hueffer, wrote that "Beethoven is in music what Shakespeare is in poetry, a name before the greatness of which all other names, however great, seem to dwindle." This is an exaggeration. There is, in reality, only one department of music—the symphony—in which Beethoven is incontestably pre-eminent; in all the others he has his equals, and in some his superiors. In the Lied, or art-song, he is far inferior to Schubert and half a dozen other masters; in the grandeur of choral writing he never equalled Bach and Handel; his 'Fidelio' is not equal to the best operas of Mozart, Weber, Wagner, Gounod, Bizet, and Verdi; his pianoforte compositions are harmonically less fascinating, and less idiomatic in style, than Chopin's and Schumann's, and in the realm

of chamber music there are works of Haydn, Mozart, Brahms, and particularly Schubert and Schumann, quite equal to the best of Beethoven's. His weakest works are in the department of vocal music, especially the Lied. He once said to Rochlitz: "Songs I do not like to write." He looked on them as bagatelles into which it was hardly worth while to put his best ideas. Hence, among his songs, there are only a few which show his genius to advantage. The best of them are 'Adelaide,' 'Die Ehre Gottes,' and 'In questa tomba.' (Consult Finck's, 'Songs and Song Writers,' pp. 28-34.) One of the most judicial biographers, Wasielewski, remarks: "While Beethoven wrote a good deal for the voice, he cannot be considered a vocal composer in the proper sense of the word. Full appreciation of the real nature of the human voice, the subtle knowledge of its resources which we admire in Handel and Mozart, he did not possess. His realm was instrumental music." Nevertheless, there is much that is of great beauty in his vocal works, which include the opera 'Fidelio,' the oratorio 'Christus am Oelberg,' two masses, a sonata, 66 songs with pianoforte, 18 canons, 7 books of English, Scotch, Irish, Welsh, and Italian songs with pianoforte, violin, and 'cello; etc. He himself considered his second mass—'Missa solennis'—his most successful work, but the musical world is much more enamored of his 'Fidelio' which, while conventional in the first act, rises in the second to such a sublime level of dramatic expressiveness that it is to be much regretted he never found time to execute his other operatic plans, which included a Macbeth, a Faust, and an Alexander. The history of 'Fidelio' and its four overtures is of particular interest, but the limits of space forbid its insertion.

For pianoforte there are 38 sonatas, 5 concertos, 21 sets of variations, and more than 50 short pieces—bagatelles, rondos, preludes, landlers, etc. Hans von Bulow spoke of Bach's 'Well-Tempered Clavichord' as the Old Testament of music and Beethoven's sonatas as the New, "in both of which we must believe;" and he declared that the mere technical mastery of these sonatas is "the task of half a life-time." They mark a tremendous advance over all his predecessors excepting Bach. In wealth of melodic ideas and rhythmic variety, as well as in structural finish, and especially in emotional expressiveness, they far surpass all previous works of their kind; yet it was not till several decades after the composer's death that they began to be generally appreciated and played in public. The pendulum then swung to the opposite extreme, and every Beethoven sonata was supposed to be a peerless masterwork, which is far from being true. (Read the admirable comments on all these works in chap. VII of J. S. Shedlock's 'The Pianoforte Sonata'). In the matter of form Beethoven was by no means the pedant many of his admirers would have him. The orthodox sonata is supposed to consist of four movements; but of his 38 sonatas only 15 have four movements; 11 have 3, and 6 have only two; moreover, his two-movement sonatas are by no means "torsos," as some have foolishly called them; they include op. 90 and op. 111, two of his very

best works, the op. 111 being in fact, his last word on the subject

The chamber music includes 8 trios for piano and 'cello; 5 trios, 16 quartets, and 2 quintets for strings, 10 sonatas for piano with violin, 5 with 'cello, 1 with horn, 3 sextets and 1 septet for strings and wind instruments; 2 octets for wind. The quartets have been made tolerably familiar, but among the other works here referred to there are many gems of which the public is still unaware. But it is when we come to the orchestral works—the 11 overtures, and 9 symphonies—that we see Beethoven in his real grandeur. Of these works Richard Wagner, who worshipped Beethoven, has written most eloquently; (see index to vol. I of Glase-napp's 'Wagner Encyclopadie,' or to Ellis's translation of Wagner's prose works, Grove's 'Beethoven's Nine Symphonies' gives an excellent analysis for amateurs). Concerning the symphonic works, Wagner wrote: "He developed the symphony to such a fascinating fullness of form and filled this form with such an unheard-of wealth of enchanting melody, that we stand to-day before the Beethoven Symphony as before the boundary line of an entirely new epoch in the history of art; for with them a phenomenon has appeared in the world, with which the art of no time and no nation has had anything to compare even remotely." It is not only that Beethoven's symphonies are longer than those of Haydn and Mozart, or broader and richer in melody, more varied in rhythm, and fuller in minute details of elaboration; what particularly distinguishes them is their greater emotionality and more powerful contrasts of moods. On the one side we have (as in the pianoforte sonatas) those soulful, tearful adagios which are a specialty of Beethoven; or the other the humorous scherzo, which he put in place of the dainty, graceful minuet of his predecessors. This symphonic scherzo was really a new thing in music, for while there is much fun in Haydn, it is of a much lighter quality. In Beethoven's there are elements of grimness and the grotesque; with an undercurrent of melancholy, as in the scherzos of Chopin. In the art of dyeing the music in deeper and more varied orchestral colors Beethoven's symphonies and overtures also mark a great advance over his predecessors.

While Beethoven stands at the head of composers of the classical school, an almost equal claim to distinction lies in this that in his works are to be found many of the germs which Weber, Schubert, Mendelssohn, Schumann, and others developed into the German romantic school. Among these germs are his inclination to shatter the sonata form (particularly in the last movement of the ninth symphony, which is epoch-making in its bold unconventionality); his disposition to allow his ideas to shape the form in which they are to be uttered; the subjective expressiveness of his music, which has five times as many expression works as Mozart's; the use of characteristic (realistic) orchestral colors; his way of playing the pianoforte and conducting an orchestra, with tempo rubato, or frequent modification of pace; and above all, his sanctioning of Programme music by his 'Pastoral Symphony,' which illustrates episodes in the country—a scene at a brook, the merry-making of peasants, the song

of birds, and a thunderstorm. It is also significant of his romantic inclinations that toward the end of his life he conceived a plan of giving poetic titles to all his sonatas and even to the separate movements. The 'Moonlight sonata,' it is well to remember, did not get its inappropriate name from him. Of the books relating to Beethoven several have already been referred to. Of the biographies the best was written in English by the American A. W. Thayer and published, in a German version only, in three vols (1866-77). An English edition, revised, with a final volume, is in preparation. Thayer also furnished a useful 'Chronologisches Verzeichniss' of Beethoven's works, of which a complete edition was printed by Breitkopf and Hartel in 1864-67. Pending the appearance of Thayer's great work, the best treatise is Grove's, in his 'Dictionary of Music and Musicians' (vol I, pp 162-209). Crowest's biography is a fair compilation in one volume. Other biographers are Wasielewski, Schindler, Marx, Nohl, Wilder, Wegeler, and Ries. Nohl's 'Beethoven and his Contemporaries' contains many literary "snap-shots." Analyses of his sonatas and symphonies have been written by Elterlein (English version) and Reinecke. Kullak's 'Beethoven's Piano-playing' is excellent. Other critical and analytical works are by Uhligsheff, Wagner (essay), Harding, Durenberg, Alberti, Lorenz, Helm, Nottebohm, and Frimmel. His letters have been printed in several volumes by Nohl, Kochel, Schone, Hadden. They are not nearly so interesting as Schumann's, Mendelssohn's, Wagner's, Liszt's, and Berlioz's.

HENRY T FINCK,
Musical Critic, 'Evening Post,' N. Y.

Beetle, an insect of the order *Coleoptera*. Beetles are distinguished from all other insects by the elytra or thickened fore wings, which are not actively used in flight, the hind wings being especially adapted for that purpose. The elytra cover and encase, thus protecting, the posterior segments of the thorax and the abdomen. The prothoracic segment is greatly enlarged, often exarated in front, to receive the head. These characters are very persistent. There are few aberrant forms and the order is remarkably homogenous and easily limited. The head is free from the thorax; it is scarcely narrowed behind, and its position is usually horizontal. The eyes are usually quite large, and there may be one or two ocelli—not more. The antennae are usually inserted just in front of the eyes, and rarely between them. They are either filiform where the joints are cylindrical, as in the ground beetles (*Carabidae*), not enlarging toward the end, or serrate, as in the *Elatridae*, where the joints are triangular and compressed, giving thereby a serrate outline to the inner edge; or clavate as in the *Silphidae*, where the enlarged terminal joints give a rounded, club-shaped termination; or lamellate, when the terminal joints are prolonged internally, forming broad, leaf-like expansions, as in the *Scarabaeidae*, while the geniculate antenna is produced when the second and succeeding joints make an angle with the first. The mandibles are always well developed as biting and chewing organs, becoming abnormally enlarged in the stag-beetles (*Lucanus*), while in certain *Scarabaeidae* they

BEETLE

are small and membranous. The maxillæ prepare the food to be crushed by the mandibles. The greatly enlarged prothorax is free and movable.

In the running species, as *carabida*, the hind wings being useless are aborted, and very rarely in some tropical *Lampyridæ* and *Scarabæidæ* both pairs of wings are wanting in both sexes, though, as in the glow-worm and some of its allies the females, are apterous. The legs are well developed, as the beetles are among the most powerful running insects; the hindmost pair of legs becoming oar-like in the swimming *Dytiscidæ* and some *Hydrophilidæ*, while in the *Gyrinidæ* both pairs of hind legs become broad and flat. The number of tarsal joints varies from the normal number five, to four and three joints, the terminal joint as usual being two-clawed. These claws are known to be wanting only in *Phanæus*, a scarabæid, and the aberrant family, *Stylopidæ*. According to the number of the tarsal joints the families of the *Coleoptera* have been grouped into the *Pentamera* (five-jointed) the *Tetramera* (four-jointed), the *Trimeræ* (three-jointed), and the *Heteromera*, which are four-jointed in the hind pair, while the first and second pairs are five-jointed. The abdomen, usually partially concealed by the wings, is sessile, its base broad; in form it is usually somewhat flattened.

A few genera are capable of producing sounds by rubbing the limbs or elytra over finely wrinkled surfaces, which in *Trox* are situated on the side of the basal segments of the abdomen, and in *Strategus* on the tergum of the penultimate segment of the abdomen, while such a surface is found in *Higyryus* on the surface of the elvtra.

The larvæ when active and not permanently enclosed (like the curculio) in the substances that form their food, are elongated, flattened, wormlike, with a large head, well developed mouth-parts, and three pairs of thoracic feet, either horny, or fleshly and retractile, while there is often a single terminal prop-leg on the terminal segment of the body and a lateral horny spine. The wood-boring larvæ of the *Cerambycidæ* are white, soft, and more or less cylindrical, while those of the *Curculionidæ* are footless or nearly so, and resemble those of the gall-flies, both hymenopterous and dipterous.

The pupæ have free limbs, and are either enclosed in cocoons of earth, or, if wood-borers, in rude cocoons of fine chips and dust, united by threads, or a viscid matter supplied by the insect. None are known to be coarctate, though some *Coccinellæ* transform within the old larva-skin, not rejecting it, as is usual in the group, while other pupæ are enclosed in the cases in which the larva lived. In some *Staphylinidæ* the pupa shows a tendency to become obcted, the limbs being soldered to the body, as if were enclosed in a common sheath. Generally, however, the antennæ are folded on each side of the clypeus, and the mandibles, maxillæ and labial palpi appear as elongated papillæ. The wing-pads being small are shaped like those of the adult *Meloe*, and are laid upon the posterior femora, thus exposing the meso- and meta-thorax to view. The tarsal joints lie parallel on each side of the middle line of the body, the hinder pair not reaching to the tips of the abdomen,

which ends in a pair of acute, prolonged, forked, incurved horny hooks, which must aid the pupa in working its way to the surface when about to transform into the beetle.

The number of known living species is between 100,000 and 200,000, and over 10,000 species are known to inhabit the United States. About 1,000 fossil species are known.

Coleoptera have been the favorites of entomologists. They have been studied when in their perfect state, more than any other insects, but owing to the difficulty of finding their larvæ and carrying them through the successive stages of growth, the early stages of comparatively few species are known. The metamorphoses are complete, and in this respect the beetles are much in advance of the orders of net-veined insects in which the transformations are incomplete. Many beetles, as the species of *Cetonia*, etc., visit flowers to collect and eat the pollen, and in doing so bring about the fertilization of those flowers.

Classification.—The systematic arrangement of the *Coleoptera* is in an unsettled state. The tiger and ground beetles are generally considered to be the "highest" *Coleoptera*, but in reality they appeared to be allied to what were the more primitive and generalized types, while what are by some authors regarded as the "lowest" beetles, that is, the weevils, are the most specialized or most highly modified. As all our classifications begin with the more primitive or earliest forms, and end with the most specialized, we should begin with the *Carabidæ* or ground beetles, as being the nearest representatives of what are supposed to be the earliest beetles. We would, therefore, adopt provisionally Sharp's primary divisions of *Coleoptera*, with some important changes. His first division or series comprises the lamellicorns (May beetle, etc.), and his second the *Adelphaga* or ground beetles. This order should be reversed.

Series 1. *Adelphaga* (*Carabidæ* of some authors). Antennæ long, slender, filiform, tarsi five-jointed; maxillæ highly developed, three-lobed, the outer palpus shaped. (Ground and tiger beetles.)

Series 2. *Lamellicornia*. Antennæ short, the terminal joints leaf-like; tarsi five-jointed.

Series 3. *Polymorpha*. Antennæ either club-like or serrated, variable in shape, as are the number of joints of the tarsus. (*Buprestidæ*, spring-beetles, etc., including many families.)

Series 4. *Heteromera*. Front and middle tarsi five-jointed, hind tarsi four-jointed; other characters very variable. *Tenebrionidæ*, *Cantharidæ*, or blister-beetles (q v.), etc.

Series 5. *Phytophaga*. Tarsi four-jointed but with a small additional joint at the base of the fourth joint; sole usually densely pubescent. (Boring or longicorn beetles; *Cerambycidæ*, leaf-beetle, potato beetle.)

Series 6. *Rhyncophora*. (Weevils.) Head prolonged in front to form a beak; palpi much reduced; tarsi four-jointed, but with an additional minute joint at the end of the fourth. The term *Isomera* was applied by Le Conte and Horn to a combination of series 1, 2, 3, and 5.

Phylogeny.—The *Coleoptera* are supposed by Braver and also Packard to have descended from some type allied to a *Campodea*-like ancestor. The larvæ of the ground beetles are

BEETLEHEAD — BEGAS

allied by their long legs and biting mouth-parts to the common *Campodea*-like progenitor; they appear to have undergone the least modification from the shape of the primitive coleopterous larva; the footless grubs of boring beetles, longicorns and weevils, being secondary forms. Thus the *Coratida* and next after them the rose-beetles (*Staphylinae*) have been regarded as the nearest to the earliest type of beetles.

Fossil beetles.—The earliest known remains of Coleoptera are five specimens from the carboniferous strata of Silesia, of which four are wing covers and one is a pronotum; these have been referred by Karsch to the families *Carabida* or *Tenebrionida*. In the lower Jurassic, however, comparatively well preserved remains of six families (*Carabida*, *Dytiscida*, *Elatrida*, *Scarabæida*, *Ceramoycida*, and *Chrysomelida*) have been detected showing that early in the Mesozoic era, nearly all the principal types of beetles had appeared; whence we naturally suppose that their ancestors evolved during the Carboniferous period, though their remains have not yet been discovered. During the Tertiary age beetles became more abundant, and a greater number of species belonging to existing genera have been found. The Oligocene fresh-water deposits of Aix and Provence, of Florissant, Colorado, contain many kinds of beetles, as also does the Miocene amber of the Baltic coast in Prussia, and the lignite of Bohemia, as well as the fresh-water marls of Germany, Utah, and Wyoming. Of the weevils 350 Tertiary species have been described, their hard bodies accounting for their preservation.

Bibliography.—The writings of Say, Harris, and others; especially Le Conte and Horn; 'Rhynchophora of America north of Mexico' ('Classification of the Coleoptera of North America').

Beetlehead. See BLACK-BELLIED PLOVER.

Beets, bāts, **Nicolaus**, Dutch poet and writer. b. Haarlem, 13 Sept 1814. He studied theology at Leyden, and after serving at Heemstede, near Haarlem, he was in 1854 appointed to the pastorate of Utrecht, and in 1874 to the chair of theology there. His poetical works have been collected (4 vols., 1873-81). Through the earlier pieces runs a strong vein of misanthropic sentiment, due probably to Byron, some of whose works he translated into Dutch (2 vols., 1835-7). His prose writings include 'Camera Obscura' (13th ed., 1880), a series of tales and sketches of life and scenery in Holland, published under the pseudonym of HILDEBRAND; they display keen observation and considerable humor. Besides several critical works, he published in theology, notes on the life of St. Paul (3d ed., 1858), and 'Stichtelijke Uren' (new ed., 8 vols., 1872).

Befana, bā-fa'na (Italian, *Befania*, "Epiphany"), a figure, generally representing an old woman, which is exhibited in Italy on the day of Epiphany by children, or in shops, etc., where things for children are sold. In Germany presents are given to children on Christmas Eve, and in France on New Year's evening, but in Italy on the day of Epiphany, and it is said that the *befana* brings them to good children.

Beg, or **Bey**, bā, a title of honor among the Turks, meaning "lord." The beg is, in some parts of the empire, inferior to a pasha.

Bega, bā'ga, **Cornelius**, Dutch painter: b. Haarlem, 1620; d. 16 Aug. 1664. He was a pupil of Ostade, whose manner he imitated. The subjects of his paintings are commonly the amusements of the Dutch peasantry and the interior of cottages and taverns. When the plague in 1664 visited Holland, a young lady, whom he loved, was attacked by it, and was abandoned by her friends. Bega remained by her side, rendering her every attention till her last moment, but caught the fatal infection and died.

Begarelli, bā-ga-rēl'le, **Antonio**, Italian designer, styled ANTONIO DI MODENA. b. Modena, about 1498; d. 1565. By his contemporaries he was considered the greatest designer of his day. He was a friend of Correggio and co-operated with him in decorating the cathedral at Parma, furnishing many of the designs and models for the artist's pictures. His groups were commonly of life size or heroic, and were greatly admired by Michael Angelo. He influenced strongly the succeeding Lombard artists in the matter of design. His 'Descent from the Cross,' the most significant of his remaining works, still adorns the Church of San Francesco at Modena.

Begas, bā'gas, **Karl**, Prussian painter. b. Heinsberg, near Aix-la-Chapelle, 30 April 1794; d. Berlin, 23 Nov. 1854. He studied first under Philippart, and in Paris under Gros. His first work, a copy of the Madonna della Sedia, attracted the attention of the king of Prussia, who appointed him painter of the Prussian court. His productions comprise historical, genre, and portrait paintings, of which the most important are 'Henry IV at the Castle of Canossa'; the 'Sermon on the Mount'; 'Christ on the Mount of Olives'; the 'Lorelei'; and the portraits of Humboldt, Schelling, Ritter, Rauch, Cornelius, and Meyerbeer. He was a member of the Berlin Academy of Fine Arts.

Begas, **Karl**, German sculptor (son of the preceding): b. 1845. He studied in the studio of his brother Reinhold and at the Berlin Academy of Art. Among his most important works are the Franco-Prussian memorial unveiled at Cassel in 1898; the groups in the Berlin "Siegeshalle," of Margrave Otho IV. and Frederick William; the statue of Knobelsdorf in the Berlin Museum, and those of Columbus and Aristotle in the University of Kiel.

Begas, **Oscar**, German artist (eldest son of Karl Begas, 1794-1854): b. 1828 d. 1883. He painted portraits with astonishing ability at the age of 12, and in 1852 won a scholarship which gave him two years of study in Italy, where he painted his 'Hour of Gossip,' now in the Berlin National Gallery. His work is mainly portraiture.

Begas, **Reinhold**, German sculptor (son of Karl Begas, 1794-1854): b. Berlin, 1831. He studied in Rome, and in 1866 settled in Berlin, where he has not only executed many important works in the strict line of his profession, but painted many portraits of women, and produced important architectural designs. Among his most characteristic works are a statue of Schil-

BEGG — BEGGING THE QUESTION

ier (1863); 'Borussia,' a colossal statue in the Ruhmeshalle in Berlin (1885); 'The Fountain of Neptune,' in the Schlossplatz, Berlin (1882); the sarcophagus of Emperor Frederick III, in the Potsdam Mausoleum (1892); 'Germania,' a colossal equestrian statue on the new Reichstag building; and a statue of Bismarck.

Begg, Alexander, Canadian author: b. Quebec, 19 July 1840. He was educated in Aberdeen, Scotland, and in St John's, P. Q. He was the pioneer of Canadian trade (1867) in Manitoba and in the Northwest Territories. During the rebellion of 1869 he advocated representative government for the people. In 1878-84 he was deputy treasurer of the province of Manitoba. He was commissioner for Manitoba to the Dominion Exhibition in 1879, and had charge of the Manitoba exhibits through Ontario, Quebec, and the Maritime Provinces in 1879-80. His works include 'Dot it Down'; 'The Creation of Manitoba'; 'A Story of the Saskatchewan'; 'A Practical Guide to Manitoba'; 'Ten Years in Winnipeg'; 'A History of the Northwest' (3 vols.), etc.

Begg, James, Scottish Free Church theologian: b. New Monkland, Lanarkshire, 1808; d. Edinburgh, 29 Sept. 1883. Entering the ministry in 1829 he joined the Free Church ranks in 1843, at the time of the Disruption, and was minister for the rest of his life at Newington, a suburb of Edinburgh. He was one of the most narrow of theological leaders and bitterly antagonistic to anything distantly approaching liberality. He opposed the use of hymns and church organs and did much to keep the Free Church as unprogressive as possible. Among his writings are 'A Handbook of Popery' (1852); 'Seat Rents Brought to the Test of the Scripture, Law, Reason, and Experience' (1838); 'The Use of Organs and Other Instruments of Music in Christian Worship Indefensible' (1866).

Beggar-my-neighbor, a game at cards, usually played by two persons, who share the pack, and, laying their shares face downward, turn up a card alternately until an honor appears. The honor has to be paid for by the less fortunate player at the rate of four cards for an ace, three for a king, two for a queen, and one for a knave; but if in the course of payment another honor should be turned up, the late creditor becomes himself a debtor to the amount of its value.

Beggar-Tick, a troublesome weed. See BURR MARIGOLD.

Beggars, a term first applied to the 300 Protestant deputies under Henri de Brederode and Louis de Nassau, who protested against the establishment of the Inquisition in Holland in April 1566. The Dutch patriots assumed this designation when they rebelled against Spain in 1572.

Beggar's Lice, a coarse weed also called Dog's Tongue. See HOUND'S TONGUE.

Beggar's Opera, *The*, a play by John Gay, was first presented in 1728, exciting a "tempest of laughter." Its object was to satirize the predatory habits of "polite" society in thief-infested London, and to hold up to ridicule Italian opera. The chief characters are thieves

and bandits. Captain Macheath, the hero, the leader of a gang of highwaymen, is loved by the ladies and feared by all but his friends—with whom he shares his booty. Peachum, the "respectable" patron of the gang, and the receiver of stolen goods, betrays his confederates from self-interest. Macheath is married to Polly Peachum, a pretty girl, who really loves her husband, and remains constant under many vicissitudes. Macheath engages to marry others, but this gets him into trouble. Being betrayed, he is lodged in Newgate. His escape, recapture, trial, condemnation to death, and reprieve, form the leading episodes in his dashing career. After his reprieve he makes tardy acknowledgment of Polly, and promises to remain constant to her for the future. Polly is an interesting dramatic character, at least three actresses having attained matrimonial peerages through artistic interpretation of the part. Gay's language often conforms to the coarse taste and low standards of his time; and the opera, still occasionally sung, now appears in expurgated form. Its best-known piece is Macheath's famous song when two of his innamoratas beset him at once:

"How happy could I be with either
Were t'other dear charmer away!"

Beggarweed, or **Tick Trefoil** (*Desmodium*), a genus of about 150 species, mostly herbs of the natural order *Leguminosæ*, natives of warm and temperate climates. Some of the species, notably the Florida beggarweed (*D. tortuosum* or *molle*) are used in Florida and elsewhere as fodder plants and as green manures on light soils. Like the clovers these plants can assimilate free nitrogen from the air. The species mentioned yields heavy crops of highly nutritive hay which is relished by stock. At the Louisiana Experiment Station six tons of hay per acre is reported. The plant is an annual from 3 to 10 feet tall, has pinnate leaves, small flowers in racemes and flat, jointed pods which adhere to clothing and animals by their hooked hairs. The plant has been found to do well in the West Indies and as far north as Virginia. About 10 native species worthy a place in the flower-garden have been offered for sale by dealers in native plants, but not generally by seedsmen. *D. gyrans*, the telegraph plant, a purple flowered perennial, native of southern Asia, is sometimes raised in hot-houses on account of the interesting movements of its leaflets when exposed to favorable temperature and sunshine.

Beggiatoa, one of the bacteria of the family *Beggiatoaceæ*. They are of sanitary interest as indicating the character of the water in which they grow,—it usually contains sulphur,—and their presence in large quantities in a water supply is usually held to mean that the water is contaminated and should be investigated. Their growth in natural sulphur waters is to be expected.

Begging the Question, in logic, is the assumption of a proposition which in reality involves the conclusion. Thus, to say that parallel lines will never meet because they are parallel is simply to assume as a fact the very thing you profess to prove. The phrase is a translation of the Latin term, *petitio principii*, and was first used by Aristotle.

Bégin, bā-zhǎn, **Louis Nazaire**, Canadian clergyman; educated at the College of St. Michael de Bellechasse, the Seminary of Quebec, Laval University, and the Grand Seminary of Quebec. About the time of his graduation from the last institution its trustees decided to found a theological department in connection with Laval University, and it was their wish that the faculty of this theological school should be educated in Rome. Therefore Dr. Bégin, who had been elected a member of the faculty, was sent to Rome in 1863, and remained abroad till 1868. During this time he traveled extensively and studied many branches of theology. On his return to Quebec he was appointed professor of dogmatic theology and ecclesiastical history in Laval University and held the chair till 1884. He became principal of the Laval normal school in 1885; was appointed bishop of Chicoutimi in 1888; coadjutor to Cardinal Taschereau, with the title of archbishop of Cyrene, in 1891; and in 1894 became administrator of the Province of Quebec. His works include 'La Primauté et l'Infaillibilité des Souverains Pontifes,' 'La Sainte Ecriture et la Règle de Foi' (1874); 'Le Culte Catholique' (1875).

Beglerbeg, bā-lēr-bā', or more accurately, **Beylerbegi**, bā-lēr-bā'ē, "prince of princes," or "lord of lords," is the title among the Turks given to the governor of certain provinces, but is not very commonly employed at the present day. The governors of Rumli, of Anatolia, and of Syria, in particular, have this title. See **BEG**.

Begon, Michel, bē-gōn, mē-shēl, French administrator: b. Blois, France, 1638; d. Rochefort, 4 March 1710. He was a naval officer, and successively intendant of the French West Indies, of Canada, of Rochefort, and La Rochelle. He is celebrated for his love of science, and the well known genus of plants, *Begonia*, was named in his honor.

Begonia, *Beefsteak Geranium*, or *Elephant's Ear*. A genus of about 350 species of succulent tropical herbs or under-shrubs of the natural order *Begoniaceae*, most abundant in Mexico and Central and South America. Since the introduction of the first species (*B. nitida*) into England in 1777 about 150 species have been utilized by horticulturists, who have produced thousands of varieties noted for the superb coloring of either or both their flowers or foliage. In general the plants are characterized by variable, lop-sided (except in one group), alternate, entire, or lobed leaves; axillary cymes of usually large monœcious flowers, varying in all shades of red, also white and yellow; numerous stamens free or basally united; two to four styles; branched or twisted stigmas; and three-winged capsular, often colored, fruits containing numerous tiny seeds. The cultivated varieties may be grouped into: (1) Summer-flowering or tuberous-rooted, which produce large single and double flowers; (2) winter-flowering or fibrous-rooted; (3) semi-tuberous or *Socotrana*, with peltate leaves; (4) ornamental-leaved, or rex, Asiatic species and their descendants, with remarkably handsome or striking foliage. There are also hybrids between members of these groups. Each group demands somewhat different cultural treatment, but in general the tuberous sorts are started from seeds, and the tubers thereafter used from year to year; other

varieties are usually increased by means of cuttings, either of the stem or of the leaf, by various methods almost confined to this group of plants. The varieties are usually easy to cultivate, but some, especially the tuberous sorts, are somewhat sensitive to dryness of atmosphere and hot sun, which usually accounts for the poor behavior of these plants in houses heated by hot air, steam, or hot water. For description of species grown in America, and for details of propagation, cultivation, etc., consult Bailey and Miller, 'Cyclopedia of American Horticulture' (N. Y. 1900-2). Consult also Drysander, 'The Genus Begonia,' in 'Transactions of the Linnean Society,' Vol. I (1789); Klatsch, 'Begoniaceen-Cattungen und Arten,' 12 plates (1855); De Candolle, 'Prodromus,' Vol. XV. (1864); Ravenscroft, 'Begonia Culture for Amateurs' (1894); Wynne, 'Tuberous Begonias.'

Béguines, beg-ēn', **Béguins**, bēg-inz, or **Béguinæ**, bēg-wi-nē, the women who live in communities, the members of which dwell not in one household, as in convents, but in a group of small cottages surrounded by a wall, with a chapel in the centre. They vow poverty and chastity so long as they remain in the béguinage as their village is called. They are the associations of praying women which arose in the Netherlands in the 13th century, the first being formed at Nivelles, Brabant, in 1226, and spread rapidly in the adjoining countries. They said they originated from a certain St. Begga, Duchess of Brabant, in the 7th century; but it is believed that they were founded by Lambert le Begue, a priest of Liège, in the 12th century. Mosheim rejects both statements. They used to weave cloth, live together under a directress, and leave on being married, or indeed whenever they pleased. They still exist in some of the Belgian towns, notably at Ghent, also in Germany, and at least in one béguinage in France, where they are renowned as makers of lace, though under different rules from those formerly observed. The corresponding communities of men were called Béghards, but these were suppressed in 1650 by Pope Innocent X.

Begum, bā'gūm (a feminine form corresponding to beg, or bey), an Indian title of honor equivalent to princess, conferred on the mothers, sisters, or wives of native rulers. The Begum of Oudh is well known in Indian history.

Behaim, bā'hīm, **Martin**, a famous cosmographer: b. Nuremberg about 1430; d. Fayal, 29 July 1506. He is distinguished as one of the most learned mathematicians and astronomers of his age. He was engaged in commerce, and traveled for the purpose of carrying on his business, from 1455 to 1479; but also devoted himself to the study of the mathematical and nautical sciences. He went from Antwerp to Lisbon in 1480, where he was received with marks of distinction. He sailed in the fleet of Diego Cam on a voyage of discovery (1484-6), and explored the islands on the coast of Africa as far as the river Zaire. He is also said to have discovered, or at least to have colonized, the island of Fayal, where he remained for several years, and assisted in the discovery of the other Azores. He was afterward knighted, and returned to his native country, where he constructed a terrestrial globe in 1492, which bears the marks of the imperfect

BEGONIA.



Leaf of the Countess Pandolfini Begonia.

BEHAM—BEHN

acquaintance of that age with the true dimensions of the earth. Some ancient Spanish historians assert that he made many discoveries, and that he gave to his friend Columbus the idea of another hemisphere. Robertson (in his 'History of America') and others contradict this statement. It is also rejected by Irving.

Beham, bā'ham, **Bartel**, German painter and engraver: b. Nuremberg, 1496; d. Rome, 1540. He studied painting under Albert Durer and later in Italy, and engraving under Marc Antonia Raimondi. Among his paintings are 'Christ Bearing the Cross,' 'A Woman Raised from the Dead by the True Cross,' and 'Marcus Curtius Leaping into the Gulf.' Among his prints are a portrait of William, Duke of Bavaria, 'Adam, Eve, and Death Before a Tree,' 'The Virgin Suckling a Child,' 'Lucretia,' 'Cleopatra,' 'Apollo Causing Marsyas to be Flayed,' and 'Christ Giving His Charge to Saint Peter.'

Beham, Hans Sebald, German painter and engraver. b. Nuremberg, 1500; d. Frankfurt, 22 Nov. 1550. He studied under Albert Durer, and was one of his ablest scholars, but rendered his talents worse than useless, both to himself and society, by employing his pencil for the most profligate purposes. The disgust produced by his licentiousness drove him from his native town to Frankfurt-on-the-Main, where dissipation made his downward progress very rapid.

Behar, bē-har', an extensive province of British India, now a part of the presidency of Bengal; pop about 25,000,000 in 1901. It was ceded to the British by the Mogul shah Alum in 1765, on condition of an annual payment of 26 lacs of rupees. It is intersected by the Ganges, and produces much opium, indigo, sugar, cotton, and saltpetre. Gaya, the birthplace of Buddha, and the scene of one of Vishnu's incarnations, is in the province, and is visited by vast numbers of pilgrims. Other places of importance in the province are Baha, Chapra, and Patna.

Be'hemoth, the name of an animal described in Job xl. 15, to the end. It is evidently an herbivorous animal; but commentators and naturalists are not agreed as to the particular species. Bochart, Gesenius, and the generality of English commentators think the description most applicable to the hippopotamus; others think it was the elephant. Nor would it militate much against this interpretation that the elephant is not a native of the country in which the scene of the poem is laid. The author of the book of Job, whether Moses or not, may have been familiar with life in Egypt and Arabia, and if so, would naturally introduce scenery and adjuncts Egyptian or Arabian, or both combined; and that the elephant was well known in Egypt is proved not only by the use of ivory in the arts, specimens of which are preserved in abundance, but also by the representation of the animal itself on early Egyptian monuments.

Behistun, bā-hīs-toon', a mountain near a village of the same name, not far from Kermanshah, in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its rocky sides, which rises almost perpendicularly to the height of 1,700 feet. These works are about 300 feet from the ground, and were executed by the orders of Darius I., king of Persia. The inscriptions set forth his gene-

alogy, enumerate his 19 victories obtained against the rebels in different provinces of his empire, and proclaim the final pacification of the latter, and his gratitude to God. The sculptures consist of a large tablet, on which are represented a king with his foot upon a prostrate man, two long-speared warriors behind him, nine captives chained together by the neck before him, and above the whole a mythological figure. The inscriptions are executed with great neatness, and the whole monument is very well preserved, the rock, which had been carefully polished, having been coated with a hard silicious varnish, much harder, indeed, than the limestone beneath. The mountain was well known in ancient times, being mentioned by Diodorus under the name of Bagistanon. The same writer states also that an inscription and figures were engraved upon the rock by the orders of Semiramis, but these if they ever existed, have now disappeared. Rawlinson was the first to copy and decipher the Behistun inscriptions.

Behm, bām, **Ernst**, German geographer: b. Gotha, 4 Jan. 1830; d. there, 15 March 1884. In 1856 he became Dr Petermann's chief assistant in editing the famous geographical periodical 'Mittellungen,' to the editorship of which he succeeded on his chief's death in 1878. In 1872 he began, in conjunction with H. Wagner, the useful 'Population of the Earth,' intended as a statistical supplement to the 'Mittellungen'; and from 1876 he undertook the statistical department of the 'Almanach de Gotha.' His more extended writings of this nature are marked by fullness, accuracy, and marked lucidity of arrangement.

Behn, bān, **Aphra**, or **Aphara**, English novelist and dramatist: b. Wye, Kent, 1640; d. London, 16 April 1689. She went to Surinam when she was very young, and remained there some years, during which time she became acquainted with the American prince, Oroonoko, whom she made the subject of a novel, subsequently dramatized by Sothorn. On her return to England she married Mr. Behn, a London merchant, but was probably a widow when selected by Charles II. to acquire intelligence on the Continent during the Dutch war. She took up her residence at Antwerp, and it is said that, by means of one of her admirers, she obtained notice of the intention of the Dutch to sail up the Thames, and transmitted the news to England. This intelligence being discredited, she returned to England, and devoted herself to intrigue and writing for support. She published three volumes of poems, by Rochester, Etherege, Crisp, and others, with some poetry of her own; and wrote 17 plays, the heartless licentiousness of which was disgraceful both to her sex and to the age which tolerated the performance of them. She was also the author of a couple of volumes of novels, and of the celebrated love-letters between a nobleman and his sister-in-law (Lord Gray and Lady Henrietta Berkeley). Pope, in his 'Character of Women,' alludes to Mrs. Behn, under her poetical name of **ASTREA**.

'The stage how loosely does Astrea tread,
Who fairly puts her characters to bed.'

She was buried in the cloisters of Westminster Abbey. An edition of her works was published in 1872.

BEHREND'S—BEISA

Behrends, bā'rēns, Adolphus Julius Fredrick, American clergyman: b. Nymwegen, Holland, 18 Dec. 1839; d. Brooklyn, N. Y., 22 May 1900. He was successively pastor of a Baptist church at Yonkers, N. Y., 1868, and of the First Baptist Church in Cleveland, Ohio, 1873; of the Union Congregational Church, Providence, R. I., 1876, and of the Central Congregational Church in Brooklyn, 1883-1900. He published 'Socialism and Christianity' (1886); 'Philosophy of Preaching' (1890); 'The Old Testament Under Fire'; 'The World for Christ.' He was a forcible writer and very popular as a pulpit orator.

Behrens, bā'rēns, Bertha, popular German novelist, who has written over the signature, W. HEIMBURG: b. Thale, 1850. She completed 'Das Eulenhäus,' a posthumous novel by E. Marlitt, whose successor as contributor to *Die Gartenlaube* she became, and among her own novels may be named 'Aus dem Leben meiner Alten Freunden' (1878, 8th ed. 1890); 'Lumpenmüllers Lieschen' (1879); 'Ihr einziger Bruder' (1882); 'Waldblumen' (1882); 'Dazumel' (1887); 'Trudchens Heirat' (1884); 'Umfreund Schuld' (1895); 'Antons Erben' (1898).

Behring, bā'ring, Emil Adolf, German physician: b. Hansdorf, 1854, and since 1895 director of the Hygienic Institute in Marburg. He has published 'Die Blutserumtherapie' (1892); 'Bekämpfung der Infektionskrankheiten' (1894) and is widely known for his discovery of diphtheria serum.

Behring, bā'ring or bē'ring. See **BERING.**

Beige, a light, woolen fabric, made of wool of the natural color; that is, neither dyed nor bleached.

Beijerland, bī'ēr-lant, a fertile island in the Netherland province of South Holland at the mouth of the Maase. It produces great quantities of flax. Pop. 13,300.

Beilan, bā-lan', a town and pass in the north of Syria, on the Gulf of Iscanderoun. The pass has more than once been of military importance, and was in 1832 the scene of a battle between Turks and Egyptians. The town, 1,584 feet above the Mediterranean, has 5,000 inhabitants.

Beilstein, bīl'stīn, Freidrich Konrad, Russian chemist: b. St. Petersburg, 1838. In 1866 he became professor of chemistry in St. Petersburg Institute of Technology. He has published 'Anleitung zur qualitativen Chemische Analyse,' which has been widely circulated (1867); 'Die Chemische Grossindustrie auf der Weltausstellung in Wien' (1873); and a celebrated 'Handbuch der Organischen Chemie' (1800-1901).

Beira, bā'ra, a province of Portugal, bounded chiefly by the River Douro on the north, by Spain on the east, and by the Tagus and Portuguese Estremadura on the south, and by the Atlantic on the west. It was formerly divided into Beira Alta (High Beira), and Beira Baixa (Low Beira). Its extent is 9,248 square miles, and the pop. (1900) 1,518,406. The capital is Coimbra. It is traversed by the Serra d'Estrella, and well watered by the Douro,

Tagus, etc. Though not fertile in grain, the produce of wine and olives is considerable. The heir-apparent of the Portuguese crown is styled Prince of Beira. For purposes of administration the province is subdivided into the districts of Aveiro, Visien, Coimbra, Guarda, and Castello Branco.

Beira, a seaport on the coast of Portuguese East Africa, at the mouth of the Pungwe River, a little to the north of Sofala. It is the nearest port to the gold-fields of Mashonaland, and a railway through Fontesville, Chimoio, Massikesse, and New Umtali to Salisbury was completed in 1899. Beira has a good harbor protected by a sand-bank. There is a hospital, an English church, and about 1,600 inhabitants, of whom about 700 are Europeans.

Beiram, bā'ram. See **BAIRAM.**

Beirut, or Beyrout, bē-rut, or bā-root', (ancient BERYTUS), a flourishing seaport of Syria, 60 miles northwest of Damascus. It stands on a tongue of land projecting into an open bay, and spreading out toward the land into a beautiful plain, backed by the mountains of Lebanon. It consists of the old town, composed generally of narrow dirty streets, the residence of the poorer classes, and the business place of the merchants; and of the new town, which stretches around it. The latter, with its modern houses, carriage roads, and gardens,—its churches, colleges, schools, and hotels,—has little or nothing of the Oriental in its composition. Beirut has rapidly increased since 1844 when its population was only 8,000, its rise being largely due to the extension of the silk trade, of which it is the centre. The better protection afforded both to foreigners and natives by its being the residence of the consuls-general has also contributed to its prosperity. It is the seat of a consulate of the United States. Besides silk its principal exports are olive oil, cereals, sesame seed, tobacco, and wool. Ship-building is carried on here; an English company completed waterworks here in 1875 and gas works were built by a French company in 1886. Besides a Scottish school for Jews, there is an American-Syrian mission in Beirut, printing annually thousands of Arabic Bibles and having a school and hospital connected with it. In ancient times Beirut was a large and important Phœnician city, and under the Romans was long celebrated for its school of jurisprudence. The Byzantine Emperor Theodosius II raised it to the rank of a metropolis. After being destroyed by an earthquake in 551, it again rose to a considerable town in the time of the Crusades. In later times it was long in the possession of the Druses. It was bombarded and taken by the British on 29 Aug. 1840. There is a railway to Damascus. Pop. estimated (1901) 120,000.

Beisa, bī'sa, a large Abyssinian antelope (*Oryx beisa*), differing from the gemsbok principally in lacking the tuft of hair on the throat and by the black patch on the front of the face being completely separated from the cheek stripe. This is probably the animal called oryx by the ancients, and may be the animal from which is derived the legend of the unicorns. Its straight horns (about 36 inches long) when seen in profile might easily appear as one. Herds of beisas are still numerous upon the plains of Somaliland. See also **GEMSBOK**; **ORYX.**

Beissel, bī'sēl, **Johann Conrad**, German mystic: b. Eberbach, 1690; d. Ephrata, Pa., 1768. He studied theology at Halle, but having been banished in 1720 for his Pietistic opinions he emigrated to Pennsylvania, settling first at Germantown and later in Lancaster County. In 1724 he returned to Germantown and adopted the Dunker faith, but his views as to celibacy and his observance of Saturday as the Sabbath were unacceptable to his neighbors, and he therefore established a sect of Seventh Day Dunkers. He attempted a hermit life, but his fellow believers gathered about him and in 1735 he founded the famous Settlement of Ephrata, Pa. (q.v.), and remained at its head till his death. He was the author of the earliest volume of German poetry published in America, 'Gottliche Liebes und Lobestone' (1730), and published several collections of hymns, such as 'The Voice of the Lonely and Forsaken Turtle Dove—that is, of the Christian Church; by a Peaceable Pilgrim traveling to Tranquil Eternity' (1747); and 'Paradisical Wonder-Play' (1766). In the latter are found the 'Brother Song' of the sect with its 215 stanzas, and the 'Sister Song' with 250. He was known at Ephrata as Friedsam, and on his tomb may be read the inscription: "Here rests an outgrowth of the love of God, 'Friedsam,' a solitary Brother, afterward a leader, ruler, teacher of the Solitary and the Congregation of Christ in and around Ephrata." See 'Chronicon Ephrateuse' (1786); Sächse, 'German Sectarians of Pennsylvania' (1899-1900).

Beit, Alfred, German colonial financier: b. Hamburg, Germany, 1853. He was educated in the schools of his native city, emigrated to South Africa in 1873, and was a diamond merchant in Kimberley 1875-88. He became partner in the banking firm of Werner, Beit & Co. in 1888. On the discovery of gold in the Transvaal he purchased mining lands on an extensive scale, and prior to the Boer war in 1899 was chief partner in mines producing annually \$90,000,000 of gold. He is at present a director of the Rand and Bultfontein mines, of the Rhodesia railways, of the Bechuana Railway Trust, and the Transvaal Consolidated Lands Company. His business offices are in Bishopsgate Street, London, and his wealth is estimated at over \$100,000,000.

Beit-el-Fakih, bāt-ēl-fa'ke, a town of Arabia, in Yemen, 32 miles south-southeast of Hodeidah, and 77 northeast of Mocha. It is celebrated for its trade in Mocha coffee, which is chiefly grown in the neighborhood. Pop. about 8,000. The word *Beit*, signifying a house or hut, is prefixed to the name of various other small towns and villages in Arabia.

Beitullah, bāt-ul'la, the name of the building in Mecca within whose enclosure the Kaaba (q.v.) is located.

Beitzke, bits'kē, **Heinrich Ludwig**, German historian: b. Muttrin, 15 Feb. 1798; d. 10 May 1867. His publications include 'History of the German War for Freedom' (1855); 'History of the Russian War—Year of 1812' (1856); 'History of the Year 1815' (1865), etc.

Beja, bā'zha (anciently PAX JULIA), a town of Portugal, in the province of Alemtejo, 85 miles southeast of Lisbon. It stands on a height, surrounded by walls flanked with 40 towers, and

is defended by an old fort. It was founded by the Romans, and some Roman remains are still visible. The town has two annual fairs and has an extensive trade in cattle and agricultural products. Pop. (1900) 8,895.

Bejapur, bē-ja-pōr' (anciently VIJAYAPURA, the impregnable city), a town of Hindustan in the Bombay presidency, near the borders of the Nizam's dominions, about 245 miles southeast of Bombay, and near the right bank of an affluent of the Krishna. From the great extent of the ruins here it would seem to have been formerly one of the largest cities of India. In its present state it may be described as two towns adjoining each other—the fort on the east, and the old town on the west. The former, though much less than the latter, has one entire and regular street 50 feet wide and nearly 3 miles long. Some of the mosques and mausoleums of Bejapur are elaborately elegant, but the prevailing character is solid and massive. The great dome of Mahomet Shah's tomb is visible far off. The fretwork on the ceilings and verandahs, the panels covered with passages of the Koran in bas-relief, and the stone trellises pierced with a mesh-work of Arabic characters, are all in the richest style of Oriental sculpture. Among the religious structures is a Hindu temple, built in the earliest style of Brahmanical architecture. There are here some guns of enormous size; one cast in 1549 is the largest piece of brass ordnance extant. Bejapur has become the chief town of Kaladgi district, and some of the old palaces are now used for public purposes. Pop. about 17,000. See Ferguson, 'Ancient Architecture in Hindustan' (1847); Ferguson, 'The Study of Indian Architecture' (1867).

Bejar, bā'jar, a town of Spain, in the province of Salamanca, 41 miles south of the town of that name. It is surrounded by old walls, and has considerable manufactures of cloth. Lord Hill defeated a French force here in 1813. In its vicinity are warm sulphur springs. Pop. (1895) 12,140.

Beke, Charles Tilstone, English traveler: b. Stepney, Middlesex, 10 Oct. 1800; d. Bromley, Kent, 31 July 1874. In his 20th year he entered on a business career, and was thus led to visit Italy. On his return he studied law at Lincoln's Inn, and in 1834 he followed up several archaeological articles in periodicals by publishing 'Origines Biblicæ, or Researches in Primeval History.' In 1837-8 he was British consul at Leipsic, and in 1840 set out on his first journey to Abyssinia. Returning in 1843 he was awarded the gold medals of the Royal Geographical societies of London and Paris, and again engaged in business. He subsequently made several efforts to open up commercial intercourse with Abyssinia, and in 1861-2 he traveled in Syria, Palestine, and Egypt. When the news of the detention of several British subjects by the king of Abyssinia arrived in 1864, Beke went out to secure their release, and was temporarily successful, but ultimately King Theodore had to be coerced by war. In the direction of the military operations Beke's knowledge of the country proved of the utmost value, and in 1870 he received a civil list pension of \$500 per annum. In 1873 he set out for Egypt in order to explore the country traversed by the Israelites, and to locate Mount Sinai. His published works com-

prise: 'The Sources of the Nile' (1860); 'The British Captives in Abyssinia' (1865); 'King Theodore and Mr. Rassam' (1869); 'The Idol in Horeb' (1871); 'Jesus the Messiah' (1872); 'Discoveries of Sinai in Arabia, and of Midian' (1878).

Bekes, bākāsh, a market town of Hungary, and capital of the county of the same name, at the junction of the Black and White Koros, 41 miles southwest of Grosswardein; formerly strongly fortified. Chief productions — flax, cattle, wheat, wine, and honey, in all of which the trade is considerable. Pop. (1900), 25,087.

Bekker, bēk'kēr, **Elizabeth**, Dutch novelist: b. Vlissingen, 24 July 1738; d. The Hague, 5 Nov. 1804. She married Adriaan Wolff, a Reformed Church minister at Beemster, who died in 1777, and lived afterward in closest friendship with Agathe Deken, who also collaborated in her most important works, 'History of Sara Burgerhart' (1782); 'History of William Leevend' (1784-5); 'Letters of Abraham Blankaart' (1787-9); 'Cornelia Wildschut' (1793-6).

Bekker, Immanuel, German scholar, distinguished by his recensions of the texts of Greek classics: b. Berlin, 21 May 1785; d. there, 7 June 1871. He studied in Halle, and, in 1811, became professor of philology in his native city. The results of his researches in the libraries of France, Italy, England, and Germany, appear in his numerous recensions of texts derived solely from MSS., and independently of printed editions. The writers included in these recensions are Plato, the Attic orators, Aristotle, Thucydides, Theognis, Aristophanes, as well as Livy and Tacitus.

Bél, bāl, **Karl Andreas**, Hungarian historian, son of Matthias Bél (q.v.): b. Presburg, 1717; d. 1782. He was professor of poetry at Leipsic and was author of 'De Vera Origine et Epocha Hunnorum, Avarum Hungarorum in Pannonia' (1757); 'De Maria Hungariæ non Rege sed Regina' (1744).

Bél, Matthius, Hungarian historian: b. Orsova, 1684; d. 1749. He was distinguished as a theologian and historian, and became rector of the Protestant schools at Neusohl. He wrote on the history of Hungary alone, and achieved much distinction. His writings are even now much valued for reference purposes.

Bel, bēl, one of the most important gods of the Babylonian mythology; mentioned in Scripture, in Is. xlv. 1; Jer. i. 2; li. 44; in the Septuagint, in Baruch vi. 40, and in the apocryphal additions to the Book of Daniel, as well as by classical authors. Much light has recently been thrown on Bel's characteristics and position in the heavenly hierarchy, by the examination of the cuneiform tablets and sculptures. It has been ascertained that, prior to 1600 B.C., the highly interesting Turanian people called Accadians, the inventors of the cuneiform writing, who wielded extensive authority in western Asia before the Semitic Assyrians and Babylonians had come into notice, worshipped as their first triad of gods, Anu, ruling over the heaven; Elu, Belu, or Bel, over the earth; and Ea, over the sea. Bel's three children, or three of his children, were Shamas, the sun-god; Sin, the moon-god; and Ishtar, the Accadian Venus.

Sayce shows that some first-born children were vicariously offered in sacrifice by fire to the sun-god. From the Accadians the observance of human sacrifice passed to various Semitic tribes and nations. Bel's name Elu identifies him with the Phœnician El, who, in a time of trouble, offered his first-born son, "the beloved," on a high place, by fire. It is not settled whether or not Bel was the same also as the Phœnician Baal. To the wrath of Bel the deluge was attributed. In Scripture times he was known exclusively as a Babylonian divinity, being distinguished from both Nebo and Merodach. In the later Babylonian empire, however, Merodach came to be generally identified with Bel, though sometimes distinguished from him, being called "the lesser Bel."

Bel and the Dragon, certain apocryphal chapters added to the canonical Book of Daniel. The Jews do not consider them part of their Scriptures. They were penned probably by an Alexandrian Jew, the language used being not Hebrew, nor Aramæan, but Greek. The story of Bel and the Dragon tells how Daniel enlightened Cyrus, represented as having been a devout worshipper of Bel, by proving that the immense supplies of food laid before the idol were really consumed, not by it or by the inhabiting divinity, but by the priests and their families. On Cyrus urging that the dragon, also worshipped, was at least a living God, Daniel poisoned it, for which he was thrown into a lion's den, where the Prophet Habakkuk fed him. Ultimately he was released, and his persecutors put to death.

The above narrative must not be confounded with one called also 'Bel and the Dragon,' translated by Fox Talbot from the cuneiform tablets. Mr. Talbot believes that the dragon, seven-headed, like the one in Revelation, would, if the tablets were complete, prove the same being that seduced some of the heavenly "gods," or angels, from their allegiance (Rev. xii. 4; Jude vi), for which he was slain by Bel. The resemblance is not to the apocryphal book now under consideration, but to the combat between Michael and the Dragon in Rev. xii. 7-17.

Bela, bāl'ō, the name of four Hungarian kings of the Arpad dynasty. **BELA I.**, son of Ladislaf, competed for the crown with his brother Andrew, and was obliged to take refuge in Poland. Having there obtained assistance, he returned at the head of a powerful force, defeated his brother, who perished in the action, and mounted the throne in 1061. He immediately began a series of important reforms, and was contemplating others when he was suddenly cut off in 1063. **BELA II.**, surnamed the Blind, because his eyes had been put out in early life by his uncle, succeeded to the throne in 1131, and at first seemed inclined to act with moderation and justice, but the vindictive spirit of his queen involved him in quarrels with his nobles, and his own intemperate habits brought on a disease which terminated his life in 1141. **BELA III.** succeeded his brother, Stephen III., in 1173, and held the reins of government with a strong hand, vigorously correcting the abuses and putting down the turbulent spirit which the troubles of previous reigns had engendered. He also repelled incursions of Bohemians, Poles, and Austrians, and retaking the towns of which the Venetians had possessed themselves, compelled them to accept of peace in 1189. He died

BELARIUS — BELCHITE

in 1106, and was succeeded by Emeric, one of two sons by his queen, a sister of Philip Augustus, king of France. BELA IV. succeeded his father, Andrew II., in 1235, and was shortly after obliged to collect an army to oppose the Tartars, who had invaded the country. In the battle which ensued he was signally defeated, and obliged to take refuge in Austria, where he was detained prisoner, and only recovered his liberty by the payment of a heavy ransom. The Tartars having retired in 1242 Bela regained his throne, and made it his object to repair the results of their invasion. He subsequently established his rule over Bosnia and northern Serbia, and died in 1270.

Belarius, a character of prominence in Shakespeare's 'Cymbeline.' Exiled by King Cymbeline, he carries away with him the two sons of the monarch and rears them as his own.

Belasco, David, American dramatist: b. San Francisco, 1862. He appeared on the stage in 1874, but soon forsook it for play writing. Alone and in collaboration, he is the author of such popular plays as 'Lord Chumley'; 'The Wife'; 'The Charity Ball'; 'The Girl I Left Behind Me'; 'The Heart of Maryland'; 'Zaza'; 'May Blossom'; 'Men and Women'; 'La Belle Russe'; 'Valérie'; 'Du Barry'; 'Hearts of Oak'; 'Naughty Anthony'; etc.

Belbeis, bēl-bās', a town of Egypt, 29 miles north-northeast of Cairo, near the railway to Suez and on the border of the desert, formerly of some importance as being on the route to the East. The ruins of the ancient Bubastis are in its neighborhood. Pop about 8,000.

Belch, Sir Toby, a roistering character in Shakespeare's comedy, 'Twelfth Night.'

Belcher, Sir Edward, English admiral and hydrographer: b. Halifax, N. S., 1799, d. 18 March 1877. Having taken part as midshipman in the defense of Gaeta and the battle of Algiers, he was in 1819 appointed to the Myrmidon sloop, destined for the African station, and in 1825 became assistant surveyor to the Bering Strait discovery expedition under Capt. Beechey. In 1829 he was promoted to the rank of commander, and served on the coast of Africa, and of Portugal, rendering on the latter occasion valuable services to the British residents by protecting their property during the political troubles in Portugal. Subsequently he was engaged for a number of years in a voyage round the world in the surveying vessel, Sulphur. In 1841 he explored the inlets of the Canton River, and materially assisted in securing the triumph of the British army. In acknowledgment of these services, he was knighted. Afterward he was employed on board of the Samarang, on surveying service in the East Indies, and was severely wounded while assisting the rajah of Sarawak, Sir James Brooke, to subdue the pirates of Borneo. From 1852 to 1854 he commanded the expedition in search of Sir John Franklin. On his return to England, he was tried before a court-martial for voluntarily abandoning the ships. The case against him, however, was not legally supported, he was acquitted, and his sword returned to him, but while some of the other officers were commended, his name was passed over in significant silence. In 1872 he became rear-admiral. He published 'The

Last of the Arctic Voyages' (1855); 'Narrative of a Voyage to the East Indies.'

Belcher, Jonathan, colonial governor of Massachusetts: b. Cambridge, Mass., 8 Jan. 1681; d. Elizabethtown, N. J., 31 Aug. 1757. He was graduated at Harvard, in 1699, and spent six years in Europe before returning to Boston, as a merchant. From 1730 to 1741 he was governor of Massachusetts and New Hampshire, a dispute over his salary causing his removal. In 1747 he was made governor of New Jersey and gave it a successful administration. He enlarged the charter of the College of New Jersey (Princeton) and gave that institution, among other benefactions, his own valuable library. 'The Belcher Papers' were issued by the Massachusetts Historical Society, 1893.

Belcher, Thomas Waugh, Anglican clergyman. b. Bandon, Ireland, 1831. He was educated at Trinity College, Dublin, and in the medical schools of Paris and Vienna and subsequently took orders in the Established Church. He has published 'Our Lord's Miracles of Healing Considered in Relation to Some Modern Objections and to Medical Science' (1872); 'Hygienic Aspects of Pogonotrophy' (1864); 'Reformation for Drunkards' (1862); 'Is Christ the Head of His Church in England' (1881); 'Apostolic Contumacy'; 'Life of Robert Brett' (1889). He has been rector of Frampton-Cotterell, Bristol, from 1886.

Belching, the raising of gases from the stomach. There is always a certain amount of air in the stomach, taken in by the act of swallowing and a certain amount of carbon dioxide is thought to be formed by the mucous membrane of the stomach; but under abnormal and diseased conditions new gases may be formed, causing much discomfort. Rapid eating, bolting one's food, and drinking large quantities of water very rapidly cause an abnormal amount of air to be swallowed. This often causes extreme distress until it is belched out. In abnormal states of digestion quantities of gas are formed from the fermentation of the food; some of these are acetylene gas, carbon dioxide, marsh gas, sulphuretted hydrogen, hydrogen, oxygen, and nitrogen. Lack of free hydrochloric acid is one of the most important factors in this gas formation. The symptoms are usually excessive escape of gases just preceding or closely following a meal. The gases gradually begin to form two to three hours after the meals eaten. They increase in amount, cause distress, and may be belched occasionally, making one taste one's meal. While eating, the new food dilates the stomach, causes distress, sometimes attacks of palpitation of the heart, and when the stomach is overdilated the gases are belched forth, sometimes in large gusts. The treatment consists primarily in more careful eating, but if one deliberately chooses to eat and suffer afterward, various digestants such as pepsin, or pancreatin, sodium bicarbonate, taken before the meal; weak hydrochloric acid may be taken with the meal, as well as sips of very hot water. These all aid somewhat in diminishing the excessive amount of fermentation. See INDIGESTION.

Belchite, bēl-chē'tā, a Spanish town, 22 miles south-southeast of Saragossa, noted as the scene of a victory gained 18 June 1809, by the

BELDEN — BELFAST

French, under Suchet, over the Spanish forces under Blake. Belchite has some manufactories of woollens. Pop. (1897) 3,409.

Belden, James Jerome, American politician: b. Fabius, N. Y., 30 Sept. 1825; d. Syracuse, N. Y., 2 Jan. 1904. He received a common school education, became a contractor and amassed a fortune in building railroads. Entering politics he became a local and State Republican leader; was elected mayor of Syracuse; elected to Congress from 1887 to 1896; and was chairman of the National Republican Committee.

Belding, Mich., city in Iowa County; on the Detroit, L. & N. R.R.; 139 miles northwest from Detroit. It has silk mills, basket, casket and furniture factories, machine shops, paper box factories and other industries. The first silk mill in the West was erected here. Pop. (1900) 3,282.

Belem, bā-līn', a town of Portugal, on the right bank of the Tagus, two miles west-southwest of Lisbon, of which it may be considered a suburb. It contains a fine church and a monastery, the former containing the remains of Camoens and Vasco da Gama.

Belemnites, a name for straight, solid, tapering, dart-shaped fossils, popularly known as arrow-heads, thunder-bolts, finger-stones, etc., but in reality the internal shell or skeleton of a molluscous animal allied to the squid or sepiæ, and the type of an extinct family, *Belemnitidæ*. The fossil remains of the animal are met with in the rocks of the upper secondary, both in this country and other parts of the world; and they are particularly abundant in the strata of the green sand formation in New Jersey. The part preserved, often detached from the loose strata, is a pointed cone sometimes eight inches long, of brown color and stony material, resembling in shape the head of a dart or javelin, whence their name. Belemnites are one of the earliest known fossils.

Bele'rium, or **Bolerium**, the ancient appellation of LAND'S END in Cornwall, England, but the origin of the name is uncertain.

Belfast, the chief commercial and manufacturing city of Ireland, the capital of the province of Ulster, on the river Lagan at the head of Belfast Lough, about 86 miles north-northeast of Dublin. The greater part of it is built on low alluvial land on the banks of the Lagan, not more than six feet above high-water mark. The country around is extremely beautiful; the position of the town renders its appearance from a distance by no means imposing, but the Lough itself presents a fine scene; and the slopes of the hills that bound it and partly encircle the town are thickly studded with the villas and country houses of the merchants. The sewerage has been improved. The streets are spacious, regular, and well lighted and macadamized; the houses, mostly of brick, are well built—many of them very handsome. Tramways and the electric light have been introduced. Four bridges cross the river, one of them an elegant structure of five arches, each of 50 feet span. The public buildings and institutions are in keeping with a city of its size and importance. Among the numerous churches all the chief religious bodies are represented, the Presbyterians possessing the greatest number of places of wor-

ship. Many of the churches are handsome buildings. Saint Anne's, the oldest of the Episcopal (Church of Ireland) churches, is about to be removed and the site occupied by a cathedral, of which the foundation stone was laid in 1899. Trinity, a fine specimen of Gothic; and St. George's, adorned with a beautiful portico, are also deserving of notice among the Episcopal churches. The more modern of the Presbyterian churches, as well as those of other denominations, display increasing taste. St. Patrick's serves as the Roman Catholic Cathedral, but is architecturally inferior to St. Malachy's. The secular buildings include the new city hall, Queen's College, a massive pile in the later Gothic style, with a façade 600 feet in length, erected at a cost of £30,000; the Presbyterian Theological College; the Methodist College, a handsome building erected in 1868 at a cost of £30,000; the municipal buildings; the county court-house; the commercial buildings and exchange; the buildings for the customs and inland revenue; the post-office; the offices of the Ulster Bank, the Bank of Ireland, the Provincial Bank, the Belfast Bank, the National Bank, the Scottish Amicable, Scottish Provident, and North British and Mercantile Assurance companies; the grand opera house; the Theatre Royal; the county jail; the Ulster Hall; the Albert memorial clock tower, 143 feet high; etc. Of the educational institutions the most prominent is Queen's College, first opened to students in 1849, with a president and over 20 professors and lecturers. Candidates for the ministry of the Presbyterian Church of Ireland receive a training in the General Assembly's Theological College. The Methodist College and the Campbell College (a secondary school) are important institutions; while the Royal Academy and the Royal Academical Institution also deserve mention. There is a free public library belonging to the city. The charitable institutions are very numerous and important. In the city there are six extensive public parks, besides the borough cemetery. Belfast is the centre of the Irish linen trade and manufacture, having within itself the great majority of the spinning-mills and power-loom factories in Ireland, some of them of immense size and of imposing appearance. The spinning of flax and weaving of linen are indeed the staple industries of the city, and have increased at a remarkable rate in modern times. The cotton manufacture, once of importance, is now of little moment. There are two large shipyards, and in their yard and engineering works Messrs Harland and Wolff employ some 10,000 hands, and have turned out some of the finest vessels afloat, one of their triumphs being the great steamer *Oceanic*, built for the White Star line. There are also breweries, distilleries, flour-mills, oil-mills, saw-mills, foundries, printing and lithographic works, tan-yards, chemical works, aerated waterworks, rope works, tobacco manufactories, felt manufactories, etc. The commerce of Belfast surpasses that of any other Irish seaport, and is rapidly increasing. By its customs revenue it is the fifth port in the United Kingdom. Belfast Lough, which forms the approach by sea, is a fine sheet of water between the counties of Down and Antrim, about 14 miles in length and 6 in breadth at the entrance, narrowing toward the city. By dredging, a straight channel has been provided to accommodate large vessels. New docks have been constructed, giving a total

BELFAST — BELGIOJOSO

harbor area of over 100 acres. One of the graving docks is 825 feet long. The most important branch of traffic by sea is across the channel. A large fleet of steamers ply regularly between Belfast and London, Plymouth, Bristol, Liverpool, Fleetwood, Morecambe, Barrow, Whitehaven, Ardrossan, Glasgow, Dublin, Waterford, etc. There is also an extensive direct trade with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic. In 1786 only 772 vessels (34,287 tons) entered the port; whereas in 1899, 11,263 vessels, with a burden of 2,539,199 tons, entered in the foreign, colonial, and coasting trades, while 11,172 vessels of 2,454,829 tons were cleared. Over 2,000,000 tons entered in the trade with Great Britain. Much of the inland trade is carried on by the Lagan Navigation, which connects the town with Lough Neagh; the Ulster Canal, connecting Lough Neagh with Enniskillen; and by three systems of railway, namely, the Great Northern, the Belfast, and Northern Counties, and the County Down. Belfast is comparatively modern. In 1637 it obtained the privilege of levying certain duties on goods and became a regular seaport; but its prosperity subsequently was much impeded by the Civil War. Early in the 18th century it was described as a handsome, thriving town, but its period of modern prosperity dates from about 1830. The harbor is under the management of an independent board. Belfast returns four members to Parliament. An American consul is resident here. Pop. (1901) 348,965.

Belfast, Maine, a city and county-seat of Waldo County, at the head of Penobscot Bay, and on the Maine C. R. R.; 30 miles from the ocean, and 132 miles northeast of Portland. It has a fine harbor, a large domestic trade, and important manufactures, including iron works, shoe factories, lumber mills and chemical works. The public library contains 5,000 volumes. The most notable industry is ship-building, begun here in 1793. Belfast was settled in 1770; was invested by the British in 1815, and was given a city charter in 1853. Pop. (1900) 4,615.

Belfort, *běl-fôr*, a fortified town of France, department of Haut Rhin, on the Savoureuse, 47 miles northeast of Bésançon. It is well built, and has an ancient castle situated on a lofty rock, a fine parish church, barracks, town house, court of primary resort, public library containing 20,000 volumes, and a communal college. Manufactures—hats, clocks, wax tapers, iron wire, sheet iron, etc. There are also breweries, tanneries, and iron furnaces. The principal trade is in grain, wine, brandy, and liquors. Iron is extensively worked in the neighborhood. In 1814 Belfort was besieged by the allies without success. In the Franco-German war it was invested by the Germans, 3 Nov. 1870, and after holding out with great bravery, capitulated, 16 Feb. 1871. In recognition of the bravery which the garrison had shown in its defense, it was allowed to march out with full military honors. This defense is commemorated by the huge 'Lion of Belfort' in front of the citadel, the work of Bartholdi. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin, which remained to France on the cession of Alsace to Germany, 26 Feb. 1871. Pop. (1896) 27,715.

Belfry, a bell-tower or bell-turret. A bell-tower may be attached to another building, or may stand apart; a bell-turret usually rises above the roof of a building, and is often placed above the top of the western gable of a church, the terms bell-cote, bell-gable, being also used. The part of a tower containing a bell or bells is also called a belfry. Strictly speaking, a belfry is a civil and not an ecclesiastical one, and in the Middle Ages, the bells in the municipal belfry became the symbols of popular freedom. The detached bell tower is of frequent occurrence on the continent of Europe, and in England the cathedral of Chichester and a few parish churches possess such an adjunct. In the United States such structures are infrequent, but in the town of Waterville, N. Y., is a detached belfry or clock-tower with quarter chimes, and Brown University at Providence is soon to have a handsome detached clock tower erected within its grounds.

Belgæ, a group of German and Celtic tribes who inhabited the country extending from the Atlantic Ocean to the Rhine, and from the Marne and Seine to the southern mouth of the Rhine, which is united with the Meuse. From time to time, until the period of Cæsar, German nations pushed forward beyond the Rhine, partly expelling the Celts from their seats, partly uniting with them; and from this union sprang a mixed nation, which, in its language as well as in its manners, resembled the Germans more than the Celts. According to the testimony of Cæsar, they were the most valiant of the Gauls. Belgic tribes seem also to have settled in early Britain.

Belgard, *běl'gard*, a town of Prussia, in Pomerania, at the junction of the Leitznitz with the Persante, with an old castle. Iron, cloth, and wood are manufactured, and there is an important horse market. Pop. (1895) 7,386.

Belgaum, *běl-gâm'*, a town of Hindustan, in the district of Belgaum, Bombay presidency, on the eastern slope of the western Ghats, 2,500 feet above the sea. It consists of a native town, fort, and cantonments, and contains the usual courts and offices, a school for the children of natives of rank, and various other schools. In 1818 the fort and town were taken by the British after a gallant resistance by the Peishwa's forces. From the salubrity of the climate and the purity of the water, Belgaum has been selected as a permanent military station. It carries on a trade in salt, dry fish, dates, etc.; and cotton is manufactured. Pop. (1901) 26,200.

Belgic Confession, a credal statement put forth in French in 1561 by Guido de Bres of Brabant and others, and sent to Philip II. of Spain to persuade him to tolerate the Calvinistic faith. In 1562 it was published in the vernacular, and subsequently in Dutch and German, and was acknowledged by the synods of Antwerp (1566) and Dort (1619).

Belgiojoso, *běl-jō-yō'sō*, **Cristina** (PRINCESS OF), Italian patriot: b. Milan, 28 June, 1808; d. there, 5 July 1871. She took a prominent part in the revolution of 1830, and was exiled by the Austrian government. She lived in Paris for several years and then returned to Italy in 1847, and in the revolution of 1848, offered her whole fortune to the patriot cause and equipped several hundred volunteers at her own expense. After a second exile of some years she returned

BELGIOJOSO — BELGIUM

under the amnesty of 1856, regained her property, and supported the policy of Cavour. She was the editor of several different periodicals in the interest of Italian liberty, and was the author of several books, among them 'Souvenirs of Exile' (1850); 'History of the House of Savoy' (1860); and 'Reflections on the Actual Condition of Italy' (1869).

Belgiojoso, a town of northern Italy, in the province and eight miles southeast of Pavia. It is situated in a beautiful and fertile plain between the Po and the Olona, and is well built, containing a parish and an auxiliary church. The old castle, in which Francis I. was temporarily lodged after being taken prisoner at the battle of Pavia, in 1525, has been converted into a magnificent château, surrounded by fine gardens. Pop. 4,000.

Belgium (French, Belgique; German, Belgien), a kingdom of Europe, bounded north by Holland, northwest by the North Sea, west and south by France, and east by the duchy of Luxemburg, Rhenish Prussia, and Dutch Limburg; greatest length, northwest to southeast, 165 miles; greatest breadth, north to south, 120 miles; area, about 11,400 square miles. Belgium, in shape, resembles a triangle, which has its vertex in the west; the base resting on Germany on the east, the shorter side facing Holland and the sea, and the larger forming the frontier of France. For administrative purposes it is divided into nine provinces—Antwerp, South Brabant, East Flanders, West Flanders, Hainaut, Liège, Limburg, Luxemburg, and Namur. These provinces do not differ much in area, and are so arranged as to form a compact and commodious division of the kingdom. South Brabant, which from containing Brussels, the capital, may be considered the metropolitan province, occupies the centre, while the others cluster round, and, with the exception of the extreme provinces of Luxemburg and West Flanders, actually touch it.

The following table shows the areas of the different provinces, with their population, on 31 Dec 1900:

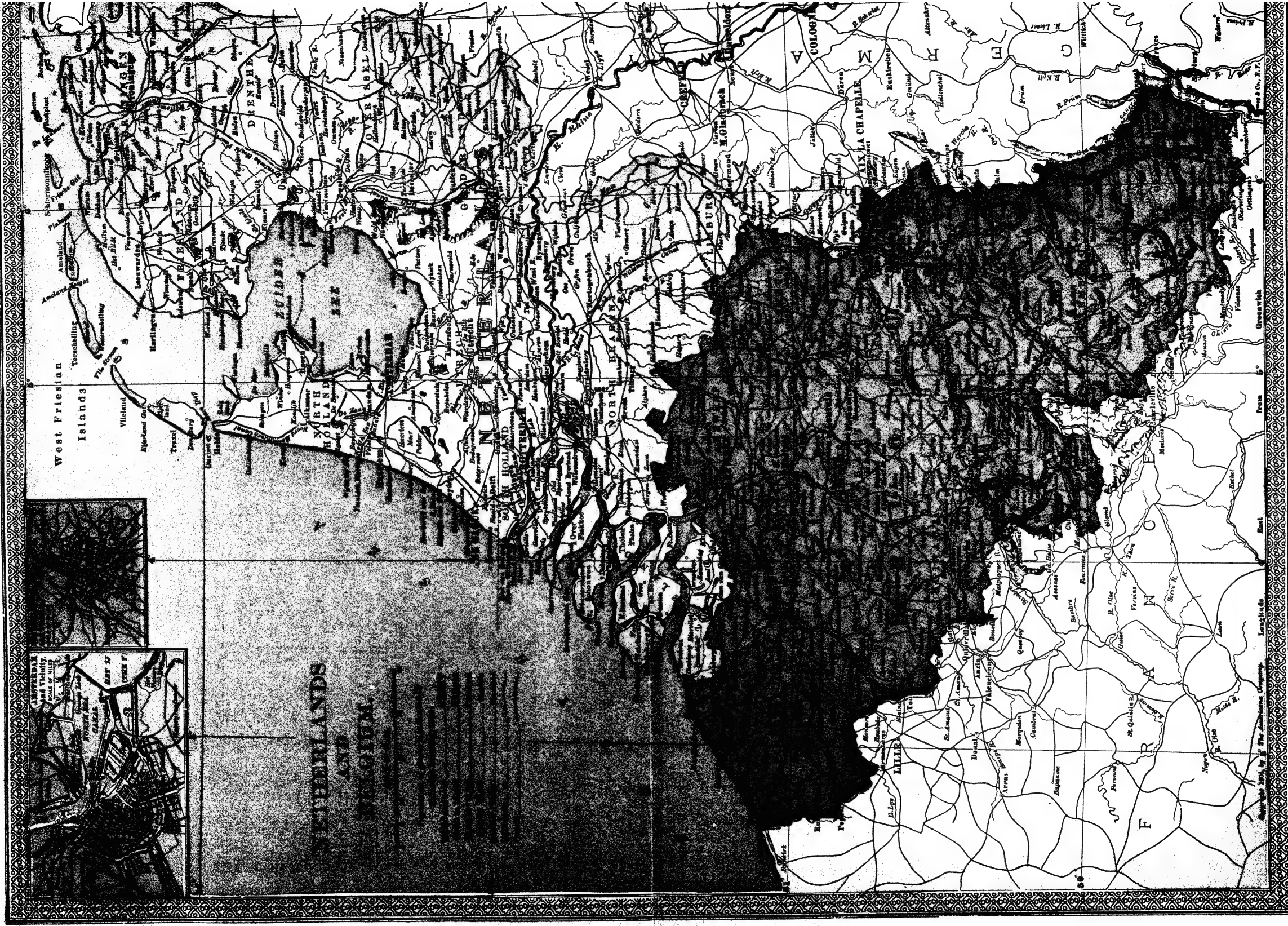
Provinces	Area in sq. miles	Population
Antwerp	1,093	819,000
Brabant	1,268	1,263,807
Flanders, East	1,158	1,029,971
Flanders, West	1,249	805,236
Hainaut	1,437	1,142,954
Liège	1,117	820,175
Limburg	931	240,796
Luxemburg	1,706	219,200
Namur	1,414	346,512
	11,373	6,687,651

Physical Features.—A general idea of the surface of the country may be obtained by regarding it as an inclined plane, somewhat rugged, and considerably elevated in the southeast, from which it slopes, more or less gradually, north and west, till it sinks into low plains, only a few feet above the level of the sea. The elevated districts are formed by ramifications of the Ardennes, which, entering Belgium from France, stretch along the south of Namur, occupy the greater part of Luxemburg, and attain their culminating point in the southeast of Liège at Stavelot, in the neighborhood of Spa, where the height exceeds 2,000 feet. The rocks appear to rest on primary formations; but

those which reach the surface generally consist of slate, old red sandstone, and mountain limestone. Proceeding northwest, in the direction of the dip, these rocks take a cover, and the coal formation becomes fully developed. This coal field is a continuation of that of the north of France, and stretches through Belgium in a northeast direction, occupying the greater part of the province of Hainaut, and a considerable part of that of Liège, and skirting the provinces of Namur and Luxemburg. It contains numerous workable seams, both of coal and iron. North and west, beyond the limits of this coal field, a more recent formation is found, covered by deep beds of clay and sand, the former prevailing more in the interior, and the latter near the coast, where it has been drifted into hillocks or downs, and forms the only barrier against the encroachments of the sea. Some of the clay in this district is fit for the manufacture of fine pottery; but the greater part of it is fit only for coarse ware, or for bricks.

In accordance with the general slope of the surface already mentioned, the main streams of Belgium have a northern direction; and the whole country lies within the basin of the German Ocean. In the southeast, where the surface is elevated and broken, numerous torrents descend with rapidity; and becoming confined within rocky, precipitous, and richly wooded banks, often furnish, if not the grandest, the most picturesque and enchanting of landscapes. On reaching the lower country their speed is slackened, and their augmented volume moves along in a slow, winding course. Only two of them,—the Meuse and the Scheldt,—have a magnitude which entitles them to the name of rivers; but so important are these two in themselves, and so numerous their affluents, that no country in Europe is better supplied with water communication. Besides the Scheldt or Schelde, and Meuse or Maas, the navigable streams are the Ambleve, Demer, Dender, Darme, Dyle, Lys, Great Nethe, Little Nethe, Ourthe, Rupel, Sambre, Yperlee, and Yser. The climate of Belgium bears a considerable resemblance to that of the same latitudes in England. Though subject to sudden change, it is on the whole temperate and agreeable. Luxemburg and Namur, where the surface is high, and the numerous hills and dales which diversify it both cheer the animal spirits and freely circulate an air at once keen and pure, are most favorable to health and longevity. The only parts of the country which can be considered unhealthy are the low flats which prevail in Flanders, and the polders or rich alluvial tracts which have been gained from the rivers by embankment, chiefly in Antwerp. There agues and other diseases engendered by a humid and sluggish atmosphere are prevalent.

Woods and Forests.—Nearly one fifth of the whole surface of the kingdom is occupied by wood. The distribution of it, however, is by no means equal; and hence, while the two Flanders and Antwerp fall far below the average amount, Luxemburg and Namur rise far above it, and are very densely wooded. In these provinces extensive tracts are covered with natural woods, in which the wolf and wild boar still have their haunts. These woods are the remains of the ancient forest of Ardennes, which Cæsar describes as stretching far out into France from the banks of the Rhine. They consist of hard wood, principally oak, which is often of great



NETHERLANDS
AND
BELGIUM.



Copyright 1901, by The American Company.

BELGIUM

size, and furnish large quantities of the most valuable timber. By carefully dressing the stools after it is cut, a fine oak copse is raised, the cuttings of which annually produces many tons of bark, which not only supplies the tanneries of the country, but leaves a considerable surplus for exportation, chiefly to England, while the wood unfit for the carpenter is partly employed as fuel and partly converted into charcoal for the use of the iron works, where the superiority of the iron smelted and wrought by it is well known. South Brabant also possesses several fine forests, among others that of Soignes, with which the field of Waterloo has made us familiar. In the other provinces scarcely anything deserving the name of forest is seen. Wood is distributed over them in occasional patches, and more frequently in the form of hedge-row. The timber thus grown is by no means small in aggregate amount, and forms a well-known feature in the rich rural landscapes which the old Flemish masters loved to paint; but taking into account the injury which the cultivated crops sustain from it, it is very questionable whether it ought to be regarded as a source of profit either to individual proprietors or to the country at large. The timber itself, consisting principally of various kinds of poplar, is soft and of an inferior description.

Agriculture.—The greater part of the country is well adapted for agricultural operations, and the inhabitants have so happily availed themselves of their natural advantages that they early began, and in some respects still deserve, to be regarded as the model farmers of Europe. In the high lands traversed by the Ardennes the climate is ungenial, and the soil so shallow and stony as almost to forbid the labor of the plow. Here the occupants display their skill, not so much by what they do, as by what they refrain from attempting. Instead of vain endeavors to force the growth of corn where it could never yield an adequate return, they have been contented to turn the natural pastures of the district to the best account by employing themselves chiefly in the raising of stock. In particular they produce a hardy breed of horses, which, being admirably adapted for light cavalry, are largely exported to France for that purpose, while vast herds of swine are fed almost at no expense on the mast of the forests. At the same time no part of the surface is allowed to lie waste. Where arable land occurs it is carefully applied to its proper use. Even the vine has not been forgotten, and sunny slopes on which little else could have been grown have been made to yield a tolerable wine. In the Ardennes valleys an inferior quality of tobacco is raised.

In the opposite extremity of Belgium, chiefly in the province of Antwerp, and partly in that of Limburg, an extensive tract occurs which strikingly contrasts in appearance with the hilly districts of the southeast, but is perhaps still less adapted for the ordinary operations of agriculture. This tract, known by the name of Campine, is a vast expanse of moorland waste of the most dreary appearance, a dead monotonous flat composed for the most part of barren sand, in which the ordinary heaths and lichens will scarcely grow. The greater part of this tract seems destined to remain forever in its natural state, but whenever a patch of more promising appearance occurs the hand of industry has been at work, and corn fields and green

pastures have become not infrequent even in the Campine. Agricultural colonies, partly free and partly compulsory, have been planted in different parts of the district. The former consist of persons generally in poor circumstances who have voluntarily engaged in reclaiming barren tracts as the means of procuring a maintenance and saving them from the degradation of pauperism. The latter consist of convicts, who, having forfeited their liberty, give compulsory labor as the penalty of their offenses. By the united exertions of both a wondrous improvement has been made, and on parts of this waste some of the finest cattle of the country are raised, and much dairy produce of excellent quality is obtained. Still, however, about 300,000 acres remain untouched.

With the exception of the two districts just described, there is no part of Belgium in which agriculture does not flourish; but the husbandry which has been so much lauded is seen in its greatest perfection in the two Flanders. Its excellence is owing not to any superior knowledge of what may be called the theory of agriculture, nor to any remarkable ingenuity in the invention of implements by which its operations are more efficiently or more cheaply performed, but chiefly to an innate spirit of economy and industry—an economy which carefully appropriates every gain, however small, and an industry which grudges no labor, however great, provided it is possible, by the application of it, to obtain an additional amount of valuable produce. In fact, the Flemish husbandry partakes more of the nature of garden than of field culture. In many of its operations, no doubt, horse labor is employed. The plow and the harrow are in frequent requisition, but the implement on which the greatest dependence is placed is the earliest and simplest of all—the spade. To give full scope for the use of it, the ground is parceled out into small fields of a square form, which have their highest point in the centre, and slope gently from it in all directions toward the sides, where ditches of sufficient size carry off the superfluous water as it filters into them. To promote this filtration the ground is trenched to a uniform depth, so that the slope of the subsoil corresponds as nearly as possible to that of the surface. In performing this trenching a considerable degree of skill and ingenuity is displayed. The performance of the whole at once would be a formidable and not a very efficient process. In a few years a new subsoil would be formed, and the trenching would require to be renewed. This is rendered unnecessary in the following manner: The land is laid out in ridges about five feet wide, and when the seed is sown it is not covered as usual by the harrow, but by earth dug from the furrows to the depth of two spits, and spread evenly over the surface. By changing the ridges and throwing the furrow of the previous year into the ridge of the next, the whole ground becomes furrow in the course of five successive crops, and is consequently trenched to the depth of about 18 inches. This process of trenching never ceases, and is unquestionably one of the most important characteristics of the Flemish husbandry.

The only other process particularly deserving of notice is the care and skill manifested in securing an adequate supply of manure. Every farm is fully stocked, and the cattle, instead of

BELGIUM

being grazed in the fields, are fed at home, in winter on turnips and other roots, and in summer on green crops carefully arranged, so as to come forward in regular succession, and yield a full supply of rich, succulent food. In addition to this, every homestead has a tank, built and generally arched with brick, into which all the liquids of the cattle sheds are conveyed, and have their fertilizing properties increased by the dissolution of large quantities of rape cake. This liquid manure is of singular efficacy in promoting the growth of flax, which enters regularly into the Flemish rotation, and is perhaps the most valuable crop of all, the produce of an acre being not infrequently sold for \$250. As this crop is one of the most exhausting which can be grown, and requires the richest manure, while it yields none, the growth of it to any great extent must, without the aid of the tank, have been impossible. At present, in Flanders alone, the value of flax annually raised has been estimated to amount to \$7,500,000.

About two thirds of the whole kingdom is under cultivation, and nearly eight ninths profitably occupied, leaving only about one ninth waste. Of this last the far greater part belongs to the comparatively barren districts of the southeast and northeast, already described; and hence, in the more favored provinces, particularly those of South Brabant, the two Flanders, and Hainaut, the quantity of waste is so very small that the whole surface may be regarded as one vast garden. It is an error, however, to assert, as is sometimes done, that Belgium raises more corn than it consumes. For many years the import has considerably exceeded the export. Considerable attention has been paid in Belgium to the raising of stock, and the breeds both of cattle and horses are of a superior description. The horses of Flanders in particular are admirably adapted for draught, and an infusion of their blood has contributed not a little to form the magnificent teams of the London draymen. In general, however, Belgium stock of all kinds is inferior to that of England.

Mines.—The mineral riches of Belgium are great, and, after agriculture, form the most important of her national interests. They are almost entirely confined to the four provinces of Hainaut, Liège, Namur, and Luxemburg, and consist of lead, manganese, calamine or zinc, iron, and coal. The lead is wrought to some extent at Vedrin, in Liège; but the quantity obtained forms only a small part of the actual consumption. Manganese, well known for its important bleaching properties, is obtained both in Liège and Namur. The principal field of calamine is at Liège, where it is worked to an extent which not only supplies the home demand, but leaves a large surplus for export. All these minerals, however, are insignificant compared with those of iron and coal. The former has its seat in the country between the Sambre and the Meuse, and also in the province of Liège. At present the largest quantity of ore is mined in that of Namur. The coal field, already described, has an area of above 500 square miles. The export is about 5,000,000 tons, forming one of the largest and most valuable of all the Belgian exports. Nearly the whole of the coal thus exported is taken by France. There cannot be a doubt that this export adds largely to the national wealth; but a question has been raised as to the policy of thus lavishly dispos-

ing of a raw material which is absolutely essential to the existence of a manufacturing community, and the quantity of which, though great, is by no means inexhaustible. One obvious effect of the great foreign demand is to raise the price, and thus place some of the most important manufacturing interests of the country in an unfavorable position for competing successfully with so formidable a rival as Great Britain. Besides minerals, properly so called, Belgium is abundantly supplied with building stone, pavement, limestone, roofing slate, and marble. Of the last, the black marble of Dinant is the most celebrated. In 1899 the products of 1,601 quarries were valued at \$11,100,000; of the iron mines, \$200,000; of 220 coal mines (22,072,000 tons), \$54,900,000.

Manufactures.—The industrial products of Belgium are very numerous, and the superiority of many of them to those of most other countries is confessed. The fine linens of Flanders, and lace of South Brabant, are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay, the cloth of Verviers, the extensive foundries, machine works, and other iron and steel establishments of Liège, Seraing, and other places. The cotton and woolen manufactures, confined chiefly to Flanders and the province of Antwerp, have advanced greatly. Other manufactures include silks, glass and glassware, hosiery, paper, beet sugar, beer. There were 17 pig iron works in operation in 1899; 46 iron manufactories; 15 steel works; 123 sugar factories, and 25 refineries; and 240 distilleries.

Trade and Commerce.—The geographical position, the admirable facilities of transport, and the indefatigable industry of the inhabitants, early combined to place Belgium at the very head of the trading countries of Europe. The gradual rise of competitors still more highly favored has deprived her of this pre-eminence, and with the limited extent of her seacoast it is not to be expected that she can ever take high rank as a naval state; but her trade is still of great importance, and within recent years has made a rapid advance. Her coal and iron, and the numerous products of her manufactures, furnish in themselves the materials of extensive traffic; while the possession of one of the best harbors in the world (Antwerp), situated on a magnificent river, which directly, or by canals, stretches its arms into every part of the kingdom, and now made accessible by a system of railways with every kingdom of central Europe, naturally renders Belgium the seat of a transit trade even more important than that which it monopolized during the Middle Ages. This she owes chiefly to the admirable system of railway communication which, in the exercise of an enlightened policy, was early established throughout the kingdom. This system has its centre at Malines, from which a line proceeds north to Antwerp; another west to Ostend; another southwest through Mons, and on to the Northern R.R. of France, which communicates directly with Paris, and another southeast to Liège, and on into Prussia, where it first communicates with the Rhine at Cologne, and thence by that river and by rail gains access both east and south to all the countries of central Europe. In addition to these great trunks, one important branch connects Liège with Namur and Mons; and another from Antwerp,

BELGIUM

after crossing the west trunk at Ghent, passes Courtray, and proceeds directly toward Lille. The ramification is thus complete; and there is not a town in Belgium of any importance which may not now, with the utmost facility, convey the products of its industry by the safest and speediest of all means of transport. The railways have a length of about 2,900 miles, three fourths belonging to the state. The value of the general commerce in 1900 was: Imports, \$718,885,000, and exports, \$659,501,950; imports for home consumption, \$443,140,000; exports of Belgian produce and manufactures, \$384,580,000; transit trade, \$274,920,000.

The articles of import for home consumption include grain and flour, raw cotton, wool, hides, coffee, tobacco, chemicals, oil-seeds, yarn, timber, petroleum, etc. The exports are principally coal, yarn (chiefly linen and woolen), cereals, machinery, flax, woolens and cottons, chemicals, steel and iron, glass and glassware, sugar (raw and refined), zinc, manure, eggs, etc. The trade with Great Britain has grown considerably of late years; for while in 1869 the exports to Great Britain amounted to \$46,957,015, and the imports of British produce from Great Britain to \$20,017,675, these were in 1898 respectively \$107,670,000 and \$69,254,500. The chief exports to Great Britain are silks, woolen yarn, cottons, flax, glass, eggs; the chief imports cottons, woolens, raw cotton, metals, and machinery. The trade with France is even greater than with Great Britain. The external trade is chiefly carried on by means of foreign (British) vessels, and the great bulk of the shipping enters and clears from the port of Antwerp. Of the tonnage entered in 1896 only about seven per cent belonged to the Belgian flag. The total burden of the Belgian mercantile marine is over 113,250 tons. Important results are expected from the *Association Belgo-Hollandaise*, an international association of Belgian and Dutch manufacturers and business men founded in 1903 to effect a closer commercial union between the two countries. The trade with the United States is important, Belgium being classed as fifth in the value of its imports from this country and seventh in the exports it sends hither.

People—The Belgian population is the densest in Europe, and is composed of two distinct races—Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liège, Namur, and part of Luxemburg. The language of each corresponds with their origin—the Flemings speaking a Germanic dialect, and the Walloons a dialect, or rather a corruption, of French, with a considerable infusion of words and phrases from Spanish and other languages. This distinct mixture of races, and the repeated changes of masters to which they have been subjected, have necessarily been very unfavorable to the formation of a national character. Still, in some leading features there is a remarkable uniformity in the population. Though the position of the country between France and Germany has made it the battlefield of Europe, the inhabitants show few warlike tendencies, and are unwearied in pursuing arts of peace. The fact bears

strong testimony to the patient endurance of the Belgians, but bespeaks, perhaps, a deficiency of physical and moral courage.

Almost the entire population belong to the Roman Catholic Church. Protestantism is fully tolerated, and even salaried by the state, but cannot count above a mere fraction (some 10,000) of the population among its adherents. An interesting circumstance connected with this state of matters is, that Belgium early embraced, and at one time seemed on the eve of being gained to the Reformation. Persecution did what perhaps it has never done in any other part of the world—not only forced the people back to a religion which they had given up, but induced them to return to it as willing converts. The country is divided into six dioceses, each of which possesses an ecclesiastical seminary. Monks and nuns are numerous, especially the latter (over 25,000). Education is in a very unsatisfactory state. At the census of 1890 nearly 27 per cent of the population above 15 years of age could neither read nor write. By law each commune must have an elementary school, and the expense of primary instruction falls partly upon the communes, partly upon the state. In all the towns colleges and middle-class schools have been established, where a superior education may be obtained; while a complete course for the learned professions is provided by four universities, two of them, at Ghent and Liège respectively, established and supported by the state; one at Brussels, called the Free University, founded by voluntary association; and one at Louvain, called the Catholic University, controlled by the clergy. French is the official language of Belgium and in general use among the educated classes, and there can scarcely be said to be a national literature. Of late, however, patriotic feelings, to which the Belgians were too long strangers, have acquired new strength; and one of its first manifestations has been an eager desire to cultivate the vernacular Flemish, which differs little from Dutch.

The population generally is moral, and apparently in comfortable circumstances. The far larger proportion of it is rural; and though landed property is very much subdivided, the Belgians, instead of exhibiting the wretchedness so common among the small occupiers in Ireland, manage, by a happy combination of agricultural with other industrial employments, to derive from their little holdings all the necessities and not a few of the comforts of life. It is not to be denied, however, that in some of the provinces, particularly in Flanders, population, in so far at least as it can be maintained by agricultural resources, has reached its limit, and that a deficiency of other employment, particularly spinning and hand-loom weaving, has placed large numbers on, if not within, the verge of pauperism. In Flanders and South Brabant a fourth of the people is dependent on total or occasional relief; and pauper riots have repeatedly occurred. Still the population continues to move on, as if with accelerated pace.

Government—The Belgian constitution combines monarchical with a strong infusion of the democratic principle. The executive power is vested in a hereditary king; the legislative in the king and two chambers,—the Senate and the Chamber of Representatives,—the former elected for eight years, the latter for four, but one half

BELGIUM

of the former renewable every four years, and one half of the latter every two years. The senators are elected partly directly, partly indirectly (by the provincial councils), and must be 40 years of age. Their numbers depend on population. The deputies or representatives are elected directly, one for every 40,000 inhabitants at most. All citizens of 25 years of age are electors, and according to certain qualifications one elector may have three votes. Each deputy is allowed \$800 per annum, and a free railway pass between his place of residence and the capital. The army is raised by conscription, to which every able man who has completed his 19th year is liable, and also by voluntary enlistment. The peace strength of the army in 1899 amounted to 51,270 officers and men; in time of war the total strength is about 140,000 men. Besides this standing army there is a *garde civique*, numbering about 43,000 men in time of peace, in addition to which there are 90,000 non-active men belonging to this force. The navy is confined to a few steamers and a small flotilla of gunboats. The estimated revenue for 1902, chiefly from railways, customs, excise, and direct taxation, was \$97,808,000; the estimated expenditure, \$97,668,880. About one fourth of the expenditure is in payment of the interest of the national debt, the total of which in 1901 was \$530,179,630. The coins, weights, and measures are the same, both in name and value, as those of France.

History.—The history of Belgium as a separate kingdom, beginning in 1830, when it was constituted an independent European state, would not truly represent the life of the people, or account even for the events of the period embraced in it. Situated between the two leading states of Europe, and deeply interested in all the political agitations resulting alike from their rivalries and their alliances, the Belgian people often changed masters. Moreover, the Belgian territory contained within itself one leading element of the dissensions which raged around it. The two great races of different origin and habits, the Celtic and Teutonic, or Latin and German-speaking peoples, whose different policies have divided Europe from the time of the Romans, were combined in its population, the Walloon provinces, Hainaut, Namur, Luxemburg, being nearly allied to the French, while Flanders, Brabant, and Limburg approximated more in character and language to the Germans. Thus not only were the great rivalries of Europe represented here in miniature, but their compression within the narrow limits of what is now one of the smallest of European states, has resulted in the formation of a distinct national character. While, therefore, the chief events in which Belgium was interested prior to 1830 are matters of European history, a brief outline of them is needed here to give a distinct conception of the character of the people which they contributed to form.

The territory anciently known as Belgian differed considerably from that which has assumed the name in modern times. According to Cæsar the territory of the Belgæ, who were one of the principal tribes of ancient Gaul, extended from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire, and subsequently formed part of the kingdom of Clovis, who subdued

nearly the whole of Gaul from the Rhine to the Mediterranean. The Franks at this time did not recognize the law of primogeniture. On the death of a monarch his dominions were divided among his sons, the more ambitious of whom again strove to reunite them under their own sway. Thus the Frankish kingdoms under the descendants of Clovis were subject to continual vicissitudes, in which the Belgian territory shared, forming successively a portion of the kingdoms of Metz, Soissons, and Austrasia, till the whole was reunited under Charlemagne or Charles the Great. This great conqueror and administrator, the first who strove to unite the states of Europe in a civilized commonwealth, was of Belgian extraction. It was at Landen and Herstal, on the confines of the forest of Ardennes, that his predecessors, the great mayors of the palace, held sway, while his own capital was established at Aix. Charlemagne in great measure destroyed his own work by adopting the Frankish custom of dividing his kingdom among his sons at his death. This practice, which had proved so disastrous to the dynasty of Clovis, was continued for some time in his family, but was ultimately abolished in France. It long prevailed among the principalities of Germany, hindering their unity, and contributing to the ascendancy of France in Europe. Thus Belgium fell to Lothaire, the grandson of Charlemagne, forming part of the kingdom of Lotharingia, which was dependent on the German empire; but by the treaty of Verdun (843) Artois and Flanders were united to France.

For more than a century this kingdom was contended for by the kings of France and the emperors of Germany. In 953 it was conferred by the Emperor Otto upon Bruno, Archbishop of Cologne, who assumed the title of archduke, and divided it into two duchies: Upper Lorraine, containing modern Lorraine, Luxemburg, and the dioceses of Metz, Toul, Verdun, and the Palatinate; and Lower Lorraine, containing Brabant, Guelders, the bishoprics of Cologne, Liège, and Cambray. These duchies were temporarily reunited under Gonthelam I., Duke of Lower Lorraine, who acquired Upper Lorraine in 1033. Among the dukes of Lower Lorraine may also be mentioned Godfrey of Bouillon, the great Crusade leader, who, in 1099, was crowned king of Jerusalem.

The feudal system, which had established itself over the greater part of Europe, likewise prevailed in the Belgian territory, which in the 11th century was divided into duchies, counties, and marquisates, under the sway of chiefs owing allegiance to the empire, or other of the greater princes, but exercising an almost absolute dominion over their own subjects. Thus were formed the counties of Holland, Brabant, Zealand, Friesland, Namur, Hainaut; the duchies of Limburg, Guelders, Juliers, Luxemburg; the marquisate of Antwerp, and others. In the frequent struggles which took place during this period, Luxemburg, Namur, Hainaut, and Liège were usually found siding with France, while Brabant, Holland, and Flanders commonly took the side of Germany. The princes and the people, however, particularly of Flanders, were not always found on the same side.

The 12th and 13th centuries were distinguished by a general uprising of the industrial communities, which had begun to grow in importance throughout Europe, against the

BELGIUM

feudal system. This movement was very strongly manifested throughout the Netherlands, less strongly perhaps in Belgium than in Holland. In both countries prosperous municipalities began to arise and assert their freedom; but the spirit of centralization, more strongly developed among the Latin-speaking races, prevailed more in the southern provinces, while the love of individual liberty, more characteristic of the German races, was more strongly manifested in the north. Many of the towns of Flanders and Brabant, however, became extremely democratic. Ghent in particular distinguished itself for the violence and frequency of its revolts against its rulers.

From this time the popular and civic element began to count for something in political combinations. If one potentate secured the alliance of a count, another might strengthen himself by secretly encouraging insurrection in his towns. The people of Flanders often allied themselves with the English, with whom their commercial intercourse and their love of freedom gave them many common interests and feelings, and both their own counts and the French monarchy often felt the effects of this alliance.

The battle of Courtray in 1302 greatly weakened the feudal authority, but the ascendancy of the popular element led to various excesses. The organization of popular power was reserved for a later age, and the battle of Rosebeque, 1382, in which the Ghentese under Philip van Artevelde (who had offered the crown of France to Richard II. of England as the price of his assistance) were totally defeated, restored the authority of the nobles. In 1384, Flanders and Artois fell to the house of Burgundy by the marriage of the Duke, a scion of the French crown, with Margaret, daughter of Louis II, Count of Nevers, the last ruler of these provinces. By a succession of happy marriages, by purchase, or by force, Holland, Zealand, Hainaut, Brabant, Limburg, Antwerp, and Namur had all by 1430 become the inheritance of the same house. In 1442 the duchy of Luxemburg was acquired, and in 1470 Guelders and Friesland. This extraordinary prosperity induced Charles the Bold, who succeeded in 1467, to attempt to unite his territories by the conquest of Alsace, Lorraine, and Liège, and raise his duchy to a kingdom. The details of this enterprise, which forms one of the most exciting episodes in European history, belong more immediately to the history of France. It ended in his defeat and death at the battle of Nancy in 1477. His daughter, Mary, who succeeded him, carried the fortunes of her house still higher, or rather she carried them into a house still more fortunate than her own, by her union with the Archduke Maximilian, son of the Emperor Frederick. Her splendid possessions had been coveted by many potentates, and there were five candidates for her hand, among whom the most important were the dauphin, son of Louis XI., and the archduke.

It now became the part of France to excite troubles in Flanders. The policy of Maximilian, conformably to the traditions of the house of Austria, was directed to the aggrandizement of his house. He was frequently at feud with his Netherlandish subjects, whose manners he took little pains to understand, and for whose liberties he had little respect. Wars and leagues

succeeded each other, which belong to the history of the great states of Europe. The Netherlands were by this union again brought under the German empire, and especially under the house of Austria, destined soon to become the most powerful in Europe. In 1512 they were formed into a division of the empire, under the title of the circle of Burgundy. East Friesland was included in the circle of Westphalia. On being called to the empire, Maximilian conferred the government of the Netherlands on his son, Philip the Fair, under whom they began to experience the material advantages of an alliance with the house of Austria. The vast European possessions of this house opened up to its subjects the greatest facilities of the age for commercial intercourse, while the discovery of America gave them in addition the commerce of a new world. The industrial skill and enterprise of the Netherlanders fitted them much more than the Spaniards, whose haughty disposition made them apt to substitute rapacity for industry, to derive permanent benefit from these opportunities. Margaret, the aunt, and Mary, the sister of Charles V., who succeeded to the government of the Low Countries, exercised it in many respects wisely and well. The former, a patroness of arts and letters, kept her court surrounded with poets, artists, and men of learning. A Council of State, consisting of the governors or stadtholders of the 17 provinces, assisted them in the administration of affairs, and such was the prosperity of the country that more than one of the cities of the Netherlands rivaled in extent and opulence the capitals of the greatest European kingdoms. This bright day was too soon clouded. The reign of Charles V. is less distinguished for the political struggles excited by a too prosperous ambition, which shook nearly every nation of Europe, than for the religious dissensions, and the social troubles resulting from them, which attended the dawn of the Reformation. The reformed opinions made great progress in the Netherlands; but here again a remarkable illustration was afforded of the strength of those differences of race, language, and sentiment which divided their populations. In Holland, as in Germany, the Reformation triumphed. On the Belgian territory, especially where the Walloon or French element of the population prevailed, although these opinions spread widely, they yielded at length, as in France, to the force of authority, or the sentiment of unity. In 1535 Mary published at Brussels an edict, condemning all heretics to death. An insurrection excited by persecution was suppressed by Charles V. in 1540, and the Netherlands were inseparably united by the law of primogeniture with the crown of Spain. No union could have been more unfortunate. The bigotry of the Spanish branch of the Austrian family has become proverbial, and a country torn with religious dissensions could not have found itself under a worse rule.

Charles V. himself a Netherlander, born in Ghent, and still more his son, Philip II., of Spain, strove to extinguish the reformed opinions among the Netherland subjects in seas of blood. Philip discarded all respect for the liberties of the Netherlands, and subjected them under his governors, particularly the Duke of Alva, to all the horrors of a hostile military rule. Thousands of victims perished by every variety of execution which a barbarous cruelty

BELGIUM

could devise, hanging, beheading, burning, drowning, interring alive; to which tortures and imprisonments were added in still greater number. During this period of desolation, great numbers of artisans, abandoning their country, carried elsewhere, especially to England and Germany, which sympathized with their opinions, the arts which had enriched their own country, and which now acquired through them a wider scope, and contributed to the industrial progress of Europe. William of Orange, the Silent, now made himself the champion of the liberties of his country. Supported chiefly by the northern states, thwarted by the jealousy of the Flemish nobles, and opposed by the Walloon provinces, which remained faithful to Spain, and even supplied her with troops, he at length succeeded in freeing the seven northern states, and forming them into the confederation of the United Provinces, whose independence, declared in 1581, was ultimately acknowledged by Spain. These events belonged chiefly to the history of Holland.

Requesens, the successor of Alva, had tried too late a more humane policy. At Antwerp and Ghent the Spanish soldiers broke out into excesses. The confederates assembled in the latter town signed the pacification of Ghent, proclaiming liberty of conscience, and convoking the Estates-General. The Estates called in the aid of France, and offered the crown to Henry III., who declined to accept it, dreading the Roman Catholic league in his own country. It is a special feature of the history of those days, that while the great rulers, particularly those of France and Germany, persecuted their reformed subjects, each was ready to protect the Protestant subjects of the others when opposed to their political policy. The success of the revolutionary party, consummated in the north, was at length checked in the southern provinces by the ability of Alexander Farnes, Duke of Parma, the Spanish commander, and by the reactionary spirit evoked in the provinces themselves, strengthened by the emigration of many influential reformers to the northern states, and the Belgian Netherlands remained attached to Spain. From 1596 to 1633 the Spanish Netherlands were transferred to the Austrian branch of the family by the marriage of Isabella, daughter of Philip II., with the Archduke Albert of Austria. On the death of Isabella they reverted to Spain. By the Treaty of Rastadt in 1714 they were again placed under the dominion of Austria. During this period they were the subject of continual intrigues, and frequently of open warfare among the European states. Twice conquered by Louis XIV., conquered again by Marlborough, coveted by Holland, Spain, Germany, France, and England, they lay continually open to the invasions and the struggles of foreign armies, and it was at this period especially that they were, as they have been called, the battlefield of Europe. Some portions of maritime Flanders, Brabant, and Limburg, which had remained to Spain, were during this period conquered and annexed by Holland, while France acquired Artois and Walloon Flanders, the south of Hainaut, and part of Namur and Luxembourg, including the important towns of Douai, Lille, Valenciennes, Dunkirk, and many others. From 1714 Austria was left in undisturbed possession of the remainder of the southern Netherlands. Joseph II., styled the Philosophical

Emperor, excited by his reforms a revolt, headed or stimulated by the monks of Flanders and Brabant, whom he had dispossessed of their convents. The Estates of the two provinces refused to vote the imposts, and were dissolved. The populace took to arms. The Virgin was proclaimed generalissimo of the patriot army. The Austrian army concentrated at Turnhout was totally defeated. After applying in vain for assistance to Holland and France, neither of which could be expected to have much sympathy with their movement, the insurgents were at length subdued, and the Austrians re-entered Brussels, October 1790. Soon after the whole Netherlands were conquered by the revolutionary armies of France, and the country was divided into French departments, a change which, as might be expected, provoked as much resistance as the people were able to offer. When Napoleon ruled France, his brother Louis became king of Holland.

Just before the battle of Waterloo, fought on Belgian territory, had once more changed the fate of Europe, Belgium was united by the Congress of Vienna to Holland, under the title of the kingdom of the Netherlands. This fusion had much to recommend it. The ports and colonies of the north formed a suitable complement to the arts and industry of the south. The Flemings and the Dutch spoke the same language and had the same origin; but there remained outside of this harmony the Walloon provinces, French in language and extraction. A most injudicious measure of the Dutch government, an attempt to assimilate the language of the provinces by prohibiting the use of French in the courts of justice, excited an opposition, which, encouraged, by the success of the French revolution of 1830, broke out into revolt. The electoral system, moreover, gave the preponderance to the northern provinces, though inferior in population, and the interests of the provinces were diametrically opposed in matters of taxation. Belgium was agricultural and manufacturing, Holland commercial; the one wished to tax imports and exports, the other property and industry. In the chambers three different languages were spoken, Dutch, German, and French; and the members frequently did not understand each other. Nothing but the most skilful government could have overcome these difficulties, and no statesman appeared fitted to grapple with them. The revolutionary movement became general in the south, and the Dutch troops, at first successful before Brussels, were finally repulsed, and compelled by the arrival of fresh bands of insurgents from all quarters, to retire. The Flemings saluted the volunteers of Liège, Mons, and Tournay by the ancient title of Belgians, and this name, which properly distinguished only a section of the people of the southern provinces, became henceforth recognized as the patriotic designation of the whole.

A convention of the great powers assembled in London to determine on the affairs of the Netherlands and stop the effusion of blood. It favored the separation of the provinces, and drew up a treaty to regulate it. In the meantime the National Congress of Belgium offered the crown to the Duke of Nemours, second son of Louis Philippe, and, on his declining it, they offered it, on the recommendation of England, to Leopold, Prince of Saxe-Coburg, who acceded

BELGOROD — BELIEF

to it under the title of Leopold I., on 21 July 1831. In November of the same year the five powers guaranteed the crown to him by the Treaty of London. Some disputes with Holland in regard to the partition of territories still remained. A convention was concluded between France and England to bring these differences to a close, and in 1839 Holland acceded to a treaty, by which Belgium surrendered to her portions of Limburg and Luxemburg, which she had retained since 1830.

During the reign of Leopold, a prosperous period of 34 years, Belgium became a united and patriotic community. Arts and commerce flourished, and a place was taken in the family of nations upon which the Belgian people could look with complacency. On the outbreak of the French revolution of 1848 Leopold declared his willingness to resign the crown if it was contrary to the wishes of his subjects that he should retain it. This declaration disarmed the Republican party, and confirmed the stability of the monarchy at a critical moment. During his reign Belgium concluded various treaties of commerce, with Great Britain in 1851 and 1862, and with France in 1861. Leopold II succeeded his father in 1865. In recent years the chief feature of Belgian politics has been a keen struggle between the clerical and the liberal party. At the elections in June 1878, the liberals gained a majority, which they lost in 1884, and failed to regain in 1890. Soon after followed a revision of the constitution, and at the elections in 1894 the clericals were returned with a great majority over liberals and socialists combined. In 1885 Leopold II became sovereign of the Congo Free State (q.v.).

Bibliography—Balau, 'Seventy Years of the History of Belgium' (1815-84); Banderken, 'History of the Formation of the Belgian Principalities in the Middle Ages'; Delplace, 'Belgium Under French Rule'; 'Belgium in the Reign of William I'; Essars, 'History of Banking in All Nations; Banking in Belgium'; Juste, 'History of Belgium'; 'Memoirs of Leopold, King of the Belgians'; Moke, 'History of Belgium'; Nothomb, 'Political and Historical Essay on the Belgian Revolution'; Pirenne, 'History of Belgium'; 'Thomissen, 'Belgium in the Reign of Leopold I.'; Van Bruyssel, 'History of Commerce in Belgium.'

Belgorod, byél' gō-rōt, or **Bielgorod**, a town in Russia, government of, and 76 miles south from the town of Kursk, on the Donetz. It is the seat of an archbishop's see, and has important fairs. Pop. (1897) 21,800

Belgrade, the capital of the kingdom of Servia, situated in the angle formed by the junction of the Save with the Danube, overlooked by a citadel on a rocky eminence about 160 feet high. The town has been almost entirely transformed in recent times, and now contains a number of fine buildings and wide streets, being provided with the electric light, tramways, telephones, waterworks, etc., and having generally the aspect of any modern European town. It contains the royal palace, residences of various ambassadors or ministers, the chief courts and government departments, archiepiscopal cathedral, Protestant church and school, high school or college, gymnasias, military school, national library of 80,000 volumes, national museum, etc. The most numerous places of worship are the

Greek-Catholic. There are no industries of any importance, but trade, however, is active, Belgrade being the chief emporium of the kingdom, the place to which most of the imports and exports of Servia are brought, and through which a large transit trade passes between Austria and Turkey. It is now connected by railway with Budapest and with Constantinople and Salonica, and carries on a large shipping trade by the Danube, and also the Save. Under the name of Singidunum, Belgrade was the station of a Roman legion, and in later years was several times destroyed in the contests of the Byzantines, Bulgarians, and Hungarians. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks. It was taken by the latter in 1521 and held by them till 1688, when it was retaken by the imperial army. Two years afterward it was again captured by the Turks, who perpetrated every sort of atrocity in the conquered city, besides killing 1,200 of the garrison. From this period it remained in possession of the Turks till 1717, when it was besieged by Prince Eugene. After a desperate conflict between the contending armies the Turks were defeated. In 1739 the Turks came into possession of it by treaty, retaining it till 1789, when it was taken by the Austrians. It was restored by treaty to the Turks in 1791; since which time it has shared the varying fortunes of Servia. In consequence of a quarrel with the Servians it was bombarded by the Turkish garrison in 1862. In 1867 it was evacuated by the Turks altogether, and since the Treaty of Berlin (July 1878) has been the capital of an independent state. An American consul resides here. See **SERVIA**. Pop. (1900) 69,097.

Belgrand, bēl-grān, **Marie François Eugene**, French civil engineer. b Ervy, 23 April 1810; d 8 April 1878. He designed the gigantic sewerage system and water supply system of Paris, and published 'La Seine'; 'Les Travaux Souterrains de Paris'; 'Les eaux Anciennes de Paris'; etc.

Belgravia, the name given to the fashionable quarter of London south and west of Belgrave Square. Till the early part of the 19th century the district was a marshy farm. The district was drained and filled in about 1825.

Belial, bē-lī-āl or bēl'yāl. By the translators of the English Bible, this word is often treated as a proper name, as in the expressions, "son of Belial," "man of Belial." In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated "wickedness," or "worthlessness." To the later Jews Belial seems to have become what Pluto was to the Greeks, the name of the ruler of the infernal regions; and in 2 Cor. vi. 15 it seems to be used as a name of Satan, as the personification of all that is bad.

Belief. In a general sense belief is the assent of the understanding to the truth of a proposition, but in a technical and theological sense, has come to be used as a mental exercise somewhat depending upon the volition of the individual. The word is used to mean the acceptance of a proposition, statement, or fact as true on the ground of evidence, authority, or irresistible mental predisposition; the state of trust in and reliance on a person, thing, or principle; as also for the fact believed, and some-

times specifically for the Apostles' Creed. Belief is by some distinguished from knowledge, inasmuch as the latter rests on evidence, while belief rests on authority. Belief should, some say, not be used of facts occurring in one's own experience, or principles of which the opposite implies absurdity, such as the axioms of geometry. These we know, and, according to this view, the term should be limited to cases where a proposition is accepted without evidence, or where such evidence as is available implies only probability. On the other hand, the psychologists of what is called the intuitive school are accustomed to regard as beliefs the fundamental data on which reasoning rests; and to say that all knowledge rests ultimately on belief. Belief, they say, may admit of all degrees of confidence, from a slight suspicion to full assurance. There are many operations of mind in which it is an ingredient—consciousness, remembrance, perception. Kant defined opinion as a judgment which is insufficiently based, subjectively as well as objectively; belief, as subjectively sufficient but objectively inadequate; knowledge, as both subjectively and objectively sufficient. The strongest beliefs may, of course, be false; beliefs in ghosts, astrological prognostications, etc., are usually treated as superstitions. Beliefs as such rest on grounds regarded as sufficient by the person believing, who is prepared to act on his belief; but their grounds may have absolutely no validity for any other person. Such beliefs are nevertheless very real. On the other hand there are many propositions accepted traditionally, and spoken of as beliefs, which are not real, vital abiding truths for those who nominally accept them; which have no influence on character or mental tone, and on which those who hold them would not be prepared to act. Faith is a word used in very much the same sense as belief, but especially signifies the acceptance of and reliance on the truths of religion.

Bibliography.—Newman, 'Grammar of Assent'; Bain, 'The Emotions and the Will' (1800); Spencer, 'Psychology' (1881); Mill, 'Analysis of the Phenomena of the Human Mind' (1869); James, 'Psychology' (1890); Brentano, 'Psychologie' (1874); Verbrot, 'Die Psychologie des Glaubens'; Balfour, 'The Foundations of Belief'; Hume, 'Inquiry' (1894); Ward, 'The Wish to Believe' (1884).

Belinda, a novel by Maria Edgeworth. Belinda Portman goes to spend the winter in London with Lady Delacour, a brilliant and fashionable woman; at her house she meets Clarence Hervey for the first time. Various obstacles keep the lovers apart, but the story ends happily with the marriage of Hervey and Belinda.

Belisarius, famous Byzantine general: b. about 505; d. 565. To him the Emperor Justinian chiefly owed the splendor of his reign. Belisarius first served in the bodyguard of the emperor, soon after obtained the chief command of an army of 25,000 men stationed on the Persian frontiers, and in the year 530 gained a complete victory over a Persian army of not less than 40,000 soldiers. The next year, however, he lost a battle against the same enemy, who had forced his way into Syria—the only battle which he lost during his whole career. He was recalled from the army, and soon became at home the

support of his master. In the year 532 civil commotions, proceeding from two rival parties, who called themselves the green and the blue, and who caused great disorders in Constantinople, brought the life and reign of Justinian into the utmost peril, and Hypatius was already chosen emperor, when Belisarius with a small body of faithful adherents restored order. Justinian, with a view of conquering the dominions of Gelimer, king of the Vandals, sent Belisarius with an army of 15,000 men to Africa. After two victories he secured the person and treasures of the Vandal king. Gelimer was led in triumph through the streets of Constantinople, and Justinian ordered a medal to be struck, with the inscription *Belisarius gloria Romanorum*, which has descended to our times. By the dissensions existing in the royal family of the Ostrogoths in Italy, Justinian was induced to attempt to bring Italy and Rome under his sceptre. Belisarius vanquished Vitiges, king of the Goths, made him prisoner at Ravenna (540), and conducted him, together with many other Goths, to Constantinople. The war in Italy against the Goths continued; but Belisarius, not being sufficiently supplied with money and troops by the emperor, demanded his recall (548). He afterward commanded in the war against the Bulgarians, whom he conquered in the year 559. Upon his return to Constantinople he was accused of having taken part in a conspiracy. But Justinian was convinced of his innocence, and is said to have restored to him his property and dignities, of which he had been deprived. His history has been much colored by the poets, and particularly by Marmontel, in his otherwise admirable politico-philosophical romance. According to his narrative, the emperor caused the eyes of the hero to be struck out, and Belisarius was compelled to beg his bread in the streets of Constantinople. Other writers say that Justinian had him thrown into a prison, which is still shown under the appellation of the Tower of Belisarius. From this tower he is reported to have let down a bag fastened to a rope, and to have addressed the passengers in these words: "Give an obolus to Belisarius, whom virtue exalted, and envy has oppressed." Of this, however, no contemporary writer makes any mention. The blind Belisarius forms the subject of a noted painting by Gérard. Tzetzes, a slightly esteemed writer of the 12th century, was the first who related this fable. Certain it is, that, through too great indulgence toward his wife, Antonina, Belisarius was impelled to many acts of injustice, and that he evinced a servile submissiveness to the detestable Theodora, the wife of Justinian. See Hodgkin, 'Italy and her Invaders' (1880-5); Bury, 'Later Roman Empire' (1893).

Belize, bē-lēz' (sometimes written BELICE or BALIZE), the capital of British Honduras. Lat. 17° 29' N.; lon. 88° 8' W. It has been suggested that the name is derived from the French *balise*, a beacon, but more probably it is a corruption of Wallace, a Scotch buccaneer named Peter Wallace, with 80 companions, having erected houses enclosed with a rude palisade at this point after the Spaniards abandoned Bacala, leaving a large part of the rugged, uninvented north coast of the Gulf of Honduras unoccupied, save by freebooters, during the latter half of the 17th century. Accordingly the name Walis, Balis, or Belize was applied by the

natives and Spaniards to the settlement, the river on which it was situated, and subsequently to the whole region occupied by the English' (see Bancroft's 'History of Central America,' II., 624). Wood-cutting was the chief occupation of this piratical establishment. The value of the forests attracting other settlers, Belize was attacked by the authorities of Yucatan, who sought to expel them as trespassers, in 1733. Various unsuccessful attempts with the same object were made in subsequent years, the most formidable in 1754. Again in 1779, war existing between England and Spain, the governor of Yucatan organized an expedition against Belize; and Spain's last effort to regain possession by force was made in 1798. Before that time the settlers had organized a government. It is an interesting fact that, originating as it did, the town has become, with its population of more than 5,000, its church, schools, and hospital, a centre for the maintenance of good order. It has the characteristic features of a small English colonial capital,—the governor's house, etc. See HONDURAS, BRITISH. MARRION WILCOX,

Authority on Latin-America.

Belknap, George Eugene, American naval officer. b. Newport, N. H., 22 Jan 1832; d. Key West, Fla., 7 April 1903. He was appointed midshipman in the navy in 1852; became lieutenant-commander in 1862; commander in 1866; captain in 1872; commodore in 1885; and rear-admiral in 1889; and was retired in 1894. He took part in the capture of the Barrier Forts on the Canton River, China, in 1856; and in the Civil War was present at the bombardment of the forts and batteries in Charleston Harbor, and in both of the attacks on Fort Fisher. In 1873, while engaged in deep sea sounding in the north Pacific Ocean, he made discoveries concerning the topography of the bed of the ocean that found high favor among scientists. He was appointed superintendent of the United States Naval Observatory in 1885, and, among other works, published 'Deep Sea Soundings.'

Belknap, Jeremy, American clergyman: b. Boston, Mass., 4 June 1744, d. there, 20 June 1798. He graduated at Harvard in 1762; was pastor of the Congregational Church in Dover, N. H., 1767-86, and of the Federal Street Church, in Boston, 1787-98; and was active for the American cause during the Revolution. The Massachusetts Historical Society, organized in 1790, recognizes him as its founder. In 1792 he became an overseer of Harvard College. He was the author of a 'History of New Hampshire' (1784-92); 'A Discourse Intended to Commemorate the Discovery of America by Columbus, with Four Dissertations' (1792); 'An Historical Account of Those Persons Who Have Been Distinguished in America,' generally known as the 'American Biography,' etc.

Belknap, William Goldsmith, American military officer: b. Newburg, N. Y., 14 Nov. 1794; d. near Fort Washita, 16 Nov. 1852. He distinguished himself in the attack on Fort Erie, in August 1814; was retained in service on the reduction of the army, in 1822, having been, in 1818, one of the assistant professors of tactics in the military academy. He became a captain in 1822, and was brevetted for faithful service, 10 years afterward. In 1842 he was appointed major of the 3d infantry, and, having served in Florida during the war, was made lieutenant-

colonel by brevet. He served on the general staff at Buena Vista, and received a sword of honor from the citizens of his own State, for his services in that battle. He also received the brevet of brigadier-general. From December 1843 to May 1851 he was in command of his regiment, and of the troops in the Cherokee nation (Arkansas). In May 1851 he was ordered to upper Texas for the purpose of keeping the Indian tribes within the lines, and while there contracted a fever, of which he died.

Belknap, William Worth, American military officer, son of Gen. W. G. Belknap: b. Newburg, N. Y., 22 Sept. 1829; d. Washington, D. C., 13 Oct. 1890. In 1861 he entered the Union army as major of the 15th Iowa Volunteers and was engaged at Shiloh, Corinth, and Vicksburg; but became most prominent in Sherman's Atlanta campaign. He was promoted to brigadier-general, 30 July 1864, and major-general, 13 March 1865. He was collector of internal revenue in Iowa from 1865 to 13 Oct. 1869, when he was appointed secretary of war, which office he occupied till 7 March 1876. He resigned in consequence of accusations of official corruption. Subsequently he was tried and acquitted.

Bell, A. See BELL, NANCY R. E. M.

Bell, Acton. See BRONTE, ANNE.

Bell, Alexander Graham, American scientist, inventor of the telephone: b. Edinburgh, Scotland, 3 March 1847. He was a son of Alexander M. Bell (q.v.), and was educated at the Edinburgh high school and university, and trained by his father in the latter's system for restoring speech to deaf-mutes. In 1870 he removed with his father to Canada, and in 1872 came to Boston as professor of vocal physiology in Boston University, where he taught his father's system with success. He had long been experimenting on the electrical transmission of sound, had designed and partly constructed a speaking telephone while in Canada, and on 14 Feb. 1876 took out a patent for it. At the Centennial Exposition in Philadelphia that year he exhibited it to multitudes, including foreign scientists, who applauded it warmly; it was still crude, but a company was formed to float it, inventive genius was turned toward perfecting it, and it rapidly assumed a practical commercial form. A number of other telephones were almost immediately brought forward, with claim to priority of invention, and years of protracted and costly law suits followed; but the Bell Company finally established its right before the United States Supreme Court, has held a virtual monopoly of the business in this country, and has made its owners and Prof. Bell very wealthy. In 1880 he invented the photophone, a telephone in which the sound is conveyed by a vibratory beam of light instead of a wire; it has transmitted articulate sounds about 700 feet, but has not been practically used. He has also invented the graphophone, a form of the phonograph for recording and reproducing speech, which is coming largely into use for the teaching of languages. He has never abandoned his first field, however, the instruction and advancement of deaf-mutes, has investigated and written much on this subject, and published his papers through the Volta Bureau, which he founded; and has been president of the American Association to Promote Teaching of Speech

to the Deaf. He has especially urged that the policy of educating deaf-mutes in asylums is pernicious, as forcing them to intermarry, and increasing the births of children so afflicted. He has been president of the National Geographic Society, and regent of the Smithsonian Institution. The French government in 1881 awarded him the Volta prize. Among his monographs are a 'Memoir on the Formation of a Deaf Variety of the Human Race.'

Bell, Alexander Melville, Scottish-American educator: b. Edinburgh, 1 March 1819. He was a distinguished teacher of elocution in his native city; in 1865 removed to London to act as a lecturer in University College; and in 1870 went to Canada and became connected with Queen's College, Kingston. He is inventor of the system of "visible speech," in which all the possible articulations of the human voice have corresponding characters designed to represent the respective positions of the vocal organs. This system has been successfully employed in teaching the deaf and dumb to speak. Besides writing on this subject he has written on elocution, stenography, etc.

Bell, Andrew, Scottish educator, author of the mutual instruction or "Madras" system of education: b. St. Andrews, 27 March 1753; d. Cheltenham, England, 27 Jan. 1832. He was educated at the university of his native town, resided for seven years in Virginia, and on returning took orders in the Church of England. In 1787 he went to India, where he became manager of the institution for the education of the orphan children of European soldiers at Madras established by the East India Company. The superintendence of this asylum was undertaken by Dr. Bell, who, having no object in view but the gratification of his benevolence, refused the salary of 1,200 pagodas (£480) which was attached to it. Failing to retain the services of properly qualified ushers, he resorted to the expedient of conducting his school through the medium of the scholars themselves. It was in the mode of conducting a school by means of mutual instruction that the new method of Dr. Bell consisted; and its value as an abbreviation of the mechanical part of teaching, and where large numbers were to be taught economically, could not be easily overestimated at the time. His system, however, is now abandoned. From the commencement of his experiment he made the scholars, as far as possible, do everything for themselves; they ruled their own paper, made their own pens, etc., while the teacher only directed them. The maxim of the school was that no boy could do anything right the first time, but he must learn when he first set about it, by means of his teacher, so as to be able to do it himself ever afterward. After superintending the school for seven years he found it necessary for his health to return to Europe. On his arrival he published in 1797 a pamphlet, entitled 'An Experiment in Education made at the Male Asylum of Madras, in which he gave an account of his system. The first place in England where the system was adopted was the charity school of St. Botolph's, Aldgate, and gradually, especially through the influence of Joseph Lancaster, it was widely carried out in England, and indeed in almost every other civilized country. Dr. Bell acquired in later life the dignity of a pre-

bendary of Westminster, and was master of Sherborn Hospital, Durham. He employed himself during his latter years in writing several works on education, among which the most valuable were: 'The Elements of Tuition'; 'The English School'; and 'Brief Manual of Mutual Instruction and Discipline.' Before his death he gave over to trustees £120,000 three per cent stock for education, half of it for the purpose of founding an academy in his native city. See 'Life by Southey' (1844); Meiklejohn, 'An Old Educational Reformer' (1881).

Bell, Andrew James, Canadian educator: b. Ottawa, 12 May 1856. He was educated at the University of Toronto, and at Breslau University; became professor of Latin and literature in Victoria University in 1889. He is an active member of the Canadian Institute, and has contributed some important papers to its 'Transactions.'

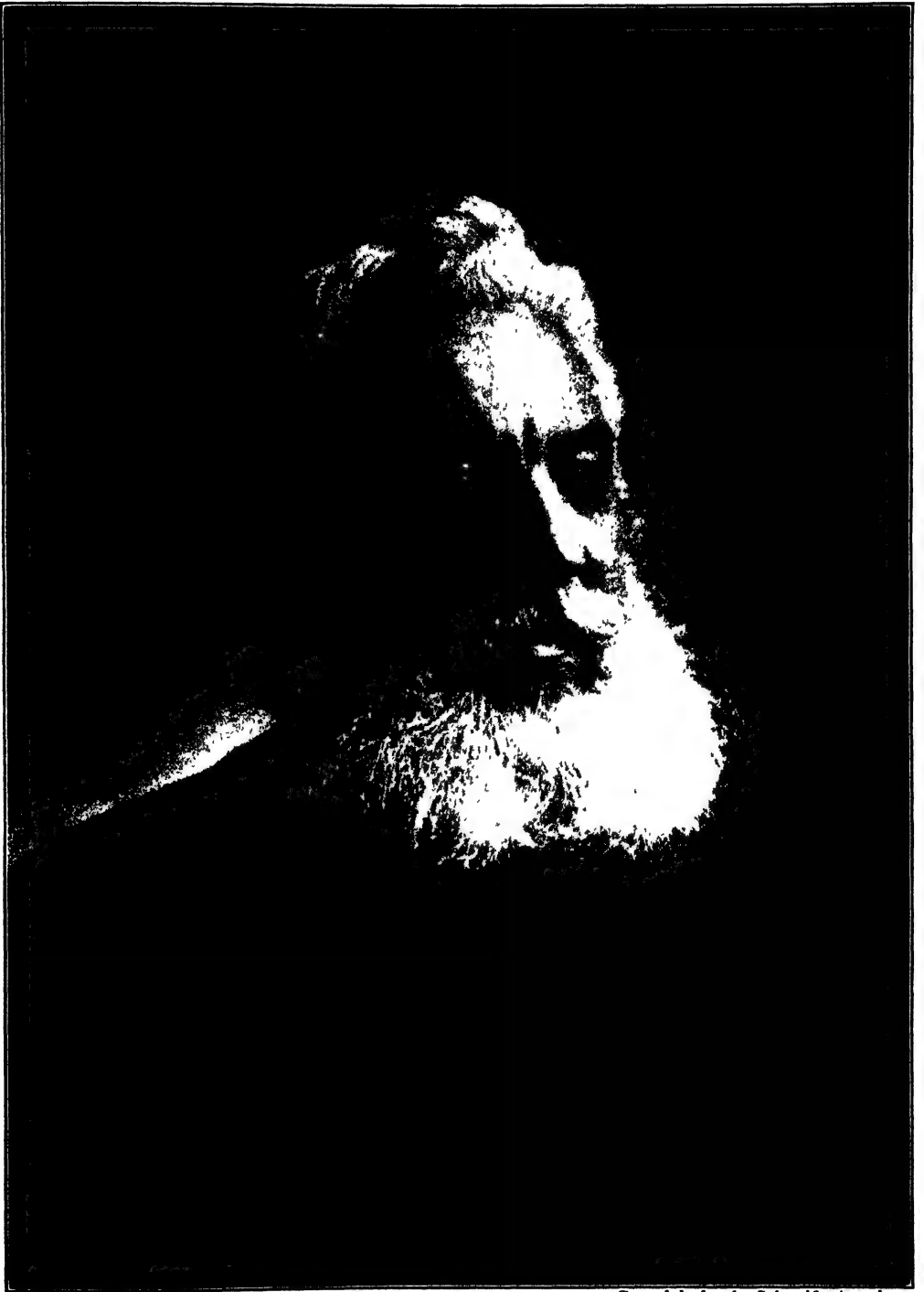
Bell, Benjamin Taylor A., Scotch-Canadian mining expert: b. Edinburgh, 2 July 1863. He went to Canada in 1882, and became editor of the 'Canada Mining Review,' and of the 'Canada Mining, Iron, and Steel Manual.' In 1890 he was appointed by the Dominion government, with Dr. Selwyn, to conduct the excursions through the mining and industrial centres of Canada of the Iron and Steel Institute of Great Britain, and the Verein Deutscher Eisenhüttenleute. The same year he organized the General Mining Association of the Province, and in 1892 was instrumental in uniting the coal, gold, and other mineral interests of Nova Scotia into a like organization.

Bell, Sir Charles, Scottish anatomist: b. Edinburgh, November 1774; d. near Worcester, England, 28 April 1842. He studied anatomy under his brother, John Bell (qv), and had scarcely reached manhood before he had proved himself to be a first-rate anatomist as well as an excellent lecturer. In 1804, being already known by his published works, he went to London, and in 1811 published an essay entitled 'A New Idea of the Anatomy of the Brain,' containing the important discovery of the distinction between sensory and motor nerves, on which his fame chiefly rests. It at once attracted general attention, established his reputation, and was doubtless the main ground on which, on the accession of William IV., he was selected for the honor of knighthood. In 1812 he was appointed surgeon to the Middlesex Hospital, to whose prosperity he afterward greatly contributed. In 1824 he accepted the chair of anatomy and surgery to the London College of Surgeons, and in 1836 that of surgery in the University of Edinburgh. His principal works are 'Anatomy of Expression' (1806); 'System of Operative Surgery'; 'Anatomy and Physiology,' with his brother John; 'Animal Mechanics' (1828); 'Nervous System' (1830); and the Bridge-water Treatise on the Hand' (1833). There is a life in French by Pichot (1859), and in 1870 a selection from Sir Charles Bell's correspondence was published.

Bell, Currer. See BRONTE, CHARLOTTE

Bell, Ellis. See BRONTE, EMILY JANE.

Bell, George Joseph, Scottish lawyer, brother of Sir Charles and John Bell: b. Edinburgh, 26 March 1770; d. 1843. He passed as advocate in 1791, and became one of the first



Copyright by the Scientific American.

ALEXANDER GRAHAM BELL.

authorities on the subject of mercantile jurisprudence and the law of bankruptcy. This distinction he earned for himself by the publication of a work which first appeared in 1804, under the title of a 'Treatise on the Laws of Bankruptcy,' but in subsequent editions was extended and appeared as 'Commentaries on the Laws of Scotland and on the Principles of Mercantile Jurisprudence.' This work, notwithstanding recent changes in the law, is still a standard. Besides the work above mentioned, he published 'Principles of the Law of Scotland,' the 10th edition of which was issued in 1897; and other works.

Bell, Henry, Scottish engineer, the first successful applier of steam to the purposes of navigation in Europe: b. Torphichen, Linlithgowshire, 7 April 1767; d. Helensburgh, 14 Nov. 1830. He practised for several years, at Glasgow, the craft of a house carpenter, but in 1808 removed to Helensburgh, where he continued to prosecute his favorite task of mechanical scheming, without much regard to the ordinary affairs of the world, though he became proprietor of baths there. The application of steam to navigation had already been attempted by Mr. Miller of Dalswinton (among others), who, in 1788, had a vessel constructed, propelled by a small engine and paddle-wheel, the scene of operations being a loch on his own property in Dumfriesshire. Some further experiments were made, yet the scheme had no practical result for several years. Henry Bell seems to have turned his attention to the subject before the end of the century, and in January 1812 produced the Comet, a vessel 40 feet long, which was found in a great measure to answer the purpose contemplated. This vessel could make way against a head tide in the river at the rate of five miles an hour, and continued to ply on the Clyde for a number of years. It may be mentioned, that Mr. Robert Fulton, an American engineer, had launched a boat upon this principle in 1807, and that it performed long voyages upon the Hudson River; but it has been proved that Fulton had derived assistance in the construction of his vessel from Bell, who must therefore be allowed the praise of having done, in his own country, what all other men, notwithstanding the superior advantages of skill and capital, had failed in doing. Bell lived to see the bosom of the Clyde dotted far and wide by innumerable copies of his own invention; to know that steamboats promised to give a new turn to the art of general warfare; yet he reaped for himself little advantage. While mankind at large were enjoying the blessings which he had pointed out to them, he approached the confines of old age with the prospect of hardly the average comforts which attended that stage of existence in the humbler walks of society. Touched by his condition, a number of benevolent individuals instituted a subscription in his behalf, and it is creditable to the good feeling of the citizens of Glasgow and other places that a considerable sum was raised. The trustees on the river Clyde also gave him an annuity of £100, which he enjoyed for several years, the half of which sum was continued to his widow. A monument was erected to his memory at Douglass Point on the Clyde.

Bell, Henry Glassford, Scottish lawyer and author: b. Glasgow, 1803; d. 1874. He

founded the Edinburgh 'Literary Journal' 1828, was admitted to the bar in 1832 and became one of the most esteemed Scottish mercantile lawyers of his day. He published a spirited defense of Mary Queen of Scots, (1830), 'Summer and Winter Hours' (1831); 'My Old Portfolio' (1832); 'Romances and Minor Poems' (1866).

Bell, Henry Haywood, American naval officer: b. North Carolina, 1807; d. 11 Jan. 1868. He was appointed a midshipman in 1823, and served on the Grampus when she was engaged in clearing the coast of Cuba of pirates. For many years he served with the East Indian squadron, and commanded one of the vessels of the squadron which, in November 1856 destroyed four forts near Canton, China. Shortly after the outbreak of the Civil War he became fleet captain of the Western Gulf squadron. He commanded one of the three divisions of the fleet which captured New Orleans, and was sent to raise the United States flag over the custom house and the city hall. In 1865 he took command of the East India squadron with the rank of commodore; in 1866 was promoted to rear-admiral; and, in 1867, retired. He was drowned at the mouth of the Osaka River, Japan.

Bell, Henry Thomas Mackenzie, English poet and critic: b. Liverpool, 2 March 1852. His collections of verse include 'The Keeping of the Vow' (1879); 'Verses of Varied Life' (1882); 'Old Year Leaves' (1883); 'Spring's Immortality' (1896); 'Pictures of Travel' (1898). He has also published such critical works as 'Charles Whitehead' (1884); 'Christina Rossetti' (1898).

Bell, Hillary, American dramatic critic: b. Belfast, Ireland, 1857; d. New York, 9 April 1903. After coming to the United States he painted portraits for some years and subsequently engaged in journalism and was the dramatic and musical critic of the New York Press. He also edited the 'Insurance Economist,' and was a vice-president of the Mutual Reserve Life Insurance Company. The life-size portrait which he painted of Ada Rehan as Katharine in 'The Taming of the Shrew,' was presented by Augustin Daly to the Shakespeare Memorial at Stratford-on-Avon.

Bell, Isaac, American philanthropist: b. New York, 4 Aug. 1814; d. there, 30 Sept. 1897. He began his business life in a banking house when 14 years old, and in 1836 became interested in large financial and other concerns. About this time he began to devote himself to the work of benevolent institutions, and was president of the department of charities and correction 1857-73. It was principally through his efforts that the Bellevue Hospital, and also the Bellevue Hospital Medical College, were founded. In connection with the first institution he established the system of ambulance service. He was also largely instrumental in the establishment of the Normal College, and was responsible for the schoolship Mercury, which came under the control of the department of Charities and Correction, and of the St. Mary's, as well, loaned by the Navy Department to the Department of Education, of which he was also for a long time a member. During the Civil War he was active in raising and disbursing money for the benefit of New York volunteers,

and in aiding soldiers' wives, widows, and orphans.

Bell, James, Scotch geographer: b. Jedburgh, 1769; d. 1833. After receiving a liberal education he served an apprenticeship to the weaving business, and in 1790 commenced the manufacturing of cotton goods upon a large and respectable scale. In the universal depression occasioned by the shock of the French Revolution in 1793, he was reduced to the condition of a common warper; but having relinquished that line of life, he was about the year 1815 engaged to improve the 'Glasgow System of Geography,' a work which had met with considerable encouragement, and was now, chiefly by the labors of Mr. Bell, extended to five volumes. It was well received by the public, and formed the basis of his principal work, 'A System of Popular and Scientific Geography,' published at Glasgow in six volumes. His 'Gazetteer of England and Wales' was in the course of publication at the time of his death.

Bell, James, Canadian physician: b. North Gower, Ont., 10 Oct. 1852. He graduated at McGill University in 1877; became house surgeon of the Montreal General Hospital the same year, and medical superintendent of it in 1881. In 1885 he became a member of the hospital staff as assistant surgeon, and in 1886 full surgeon. In 1894 he was made consulting surgeon to the General Hospital, surgeon of the Royal Victoria Hospital of Montreal, and professor of clinical surgery in McGill University.

Bell, James Franklin, American soldier: b. Shelbyville, Ky., 9 Jan. 1856. He was graduated from the United States Military Academy 1878; served on the plains in the 7th United States Cavalry, 1878-94; and was aid to Gen. J. W. Forsyth in California, Arizona, and Washington. He went to the Philippines with the original expedition in 1898, and his military career there has been of the most daring and brilliant kind. As colonel of the 36th regiment of volunteers, he was not attached to any brigade, but acted as a free lance, reporting only to his division commander. He received a medal of honor for most distinguished gallantry in action 9 Sept. 1899, near Porac, in Luzon. While in advance of his regiment he charged seven insurgents with his pistol and compelled the surrender of the captain and two privates under a close and hot fire from the remaining insurgents, who were concealed in a bamboo thicket. In December 1900 he was made a brigadier-general in the regular army, being promoted over more than 500 captains, 200 majors, 98 lieutenant-colonels, and 77 colonels.

Bell, James Montgomery, American soldier: b. Williamsburg, Pa., 1 Oct. 1837. He entered the 86th Ohio infantry, and served with distinction throughout the Civil War, being twice brevetted for gallant and meritorious services in the battles of the Wilderness and Ream's Station, Va. Entering the regular army as 2nd lieutenant in 7th Cavalry, 1866, he took part in the Cheyenne and Arapahoe war, 1867-9; the Sioux wars, 1876-81, and the Nez Percés war, 1877. He received a brevet-commission of lieutenant-colonel for gallant services in action against the Indians at Cañon Creek, Montana, 13 Sept. 1877. He commanded in

southern Luzon, Philippine Islands, 1900-1, and was appointed brigadier-general of volunteers, Jan. 20, 1900.

Bell, John, Scotch traveler: b. Antermomy, 1691; d. there, 1 July 1780. Having gone to St. Petersburg in 1714, after the completion of his studies, he happened to be in that city when an embassy was being sent to the Sophy of Persia, and was appointed medical attendant to the ambassador. On his return from Persia to the Russian capital in 1718 he found another embassy preparing to set out for China, and through the influence of the ambassador whom he had attended to Persia he obtained an appointment in it also. The embassy arrived at Pekin "after a tedious journey of exactly 16 months." The embassy returned in January 1722. The war between Russia and Sweden was now concluded, and the czar had determined to undertake an expedition into Persia, at the request of the sophy, to assist that prince against the Afghans, his subjects, who had seized upon Kandahar and possessed themselves of several provinces on the frontiers toward India. Bell's former journey to Persia gave him peculiar advantages, and he was accordingly engaged to accompany the army to Derbend, from which he returned in December 1722. In 1737 he was sent to Constantinople by the Russian chancellor, and Mr. Rondeau, the British minister at the Russian court. He seems now to have abandoned the public service, and to have settled at Constantinople as a merchant. About 1746 he married a Russian lady and returned to Scotland. The only work written by him is his 'Travels from St. Petersburg in Russia to Various Parts of Asia' (1763).

Bell, John, distinguished Scotch surgeon: b. Edinburgh, 12 May 1763; d. Rome, 15 April 1820. He was a brother of Sir Charles and George Joseph Bell, and after completing his professional education traveled for a short time in Russia and the north of Europe; and on his return began to deliver lectures on surgery and midwifery. These lectures, delivered between 1786 and 1796, were very highly esteemed, and speedily brought him into practice as a consulting and operating surgeon. The increase of his private practice, indeed, rendered it necessary for him, in 1796, to discontinue his lectures, and from that time forward he devoted himself to his patients, and to the preparation of the several publications of which he was the author. Patients came to him from all quarters, both of Scotland and England, and even from the Continent; and during that interval he performed some of the most delicate and difficult operations in surgery. Early in 1816 he was thrown by a spirited horse, and appears never to have entirely recovered from the effects of the accident. He was the author of 'The Anatomy of the Human Body' (1793-1802; 3d edition, with plates by Charles Bell, 1811); 'Engravings of the Bones, Muscles, and Joints,' illustrating the first volume of the 'Anatomy of the Human Body,' drawn and engraved by himself (1794, 3d edition); 'Engravings of the Arteries,' illustrating the second volume of the 'Anatomy of the Human Body' (1801); 'Discourses on the Nature and Cure of Wounds' (1795); 'The Principles of Surgery' (1801-8); 'Letters on Professional Character'; 'Observations on Italy.'

Bell, John, American statesman: b. near Nashville, Tenn., 15 Feb. 1797; d. Cumberland Iron Works, Tenn., 10 Sept. 1869. Graduating at Cumberland College (now University of Nashville) in 1814, he practised law until 1827, when he was elected to Congress. He received successive re-elections until 1841 when he became secretary of war in President Harrison's cabinet, but resigned when President Tyler withdrew from the Whig party. From 1847 to 1859 he was senator from his State. He was chairman of several important committees, and vigorously opposed the Kansas-Nebraska bill and the Lecompton constitution framed for Kansas. In May 1860 he was nominated for President by the Constitutional Union party (q.v.), but was defeated. During the Civil War he took no active part in politics.

Bell, John, English sculptor: b. Hopton, Suffolk, 1811; d. 25 March 1895. His best-known works are the 'Eagle Slayer'; 'Una and the Lion'; 'The Maid of Saragossa'; 'Imogen'; 'Andromeda'; statues of Lord Falkland, Sir Robert Walpole, Newton, Cromwell, etc., and the Wellington Memorial in Guildhall. He was one of the sculptors of the Guards' Monument in Waterloo Place, London, and the Prince Consort Memorial in Hyde Park. He was the author of several professional treatises and of a drama, 'Ivan: a Day and a Night in Russia'.

Bell, Lilian, American novelist: b. Kentucky, 1867. In 1900 she was married to Arthur Hoyt Boyne, but continues to write under her maiden name. Her writings include 'The Love Affairs of an Old Maid' (1893); 'A Little Sister to the Wilderness' (1895); 'The Under Side of Things' (1896); 'From a Girl's Point of View' (1897); 'The Instinct of Stepfatherhood' (1898); 'As Seen By Me' (1900); 'The Expatriates' (1900); 'Yessum' (1901); 'Abroad With the Jimmies'; 'Hope Loring'; 'Sir John and the American Girl'.

Bell, Sir Lowthian, English manufacturer and politician: b. Newcastle-on-Tyne, 1816. He was mayor of his native city 1854-62, sat in the House of Commons for Hartlepool 1875-80, and was made a baronet in 1885. He founded the Clarence Iron Works on the Tees. His publications include 'The Chemical Phenomena of Iron Smelting' (1872); 'Report on the Iron Manufacture of the United States, and a Comparison of It with That of Great Britain' (1877).

Bell, Nancy R. E. Meugens, English art writer: b. Lambeth, London. Until her marriage to A. G. Bell in 1882 she wrote over the signature N. D. ANVERS. She has published 'Elementary History of Art'; 'Masterpieces of the Great Artists'; 'Life of Gainsborough'; 'Representative Painters of the 19th Century'; 'St. Antony of Padua'; 'An Old Educational Reformer: J. M. D. Meiklejohn'; 'Memoirs of Baron Le Jeune'; 'Science Ladders Series' (8 vols.); 'Raphæl'; 'Lives and Legends of the Saints'; 'The Saints in Christian Art.'

Bell, Robert, Irish journalist and miscellaneous writer: b. Cork, 16 Jan. 1800; d. London, 12 April 1867. He settled in London in 1828, edited an important weekly paper, the *Atlas*, for several years, and afterward the 'Monthly Chronicle,' 'Mirror,' and 'Home News.' He compiled several volumes of 'Lard-

ner's Cabinet Cyclopædia'; wrote three plays, 'The Ladder of Gold,' a novel (1856); 'Hearts and Altar,' a collection of tales (1852), and did a great deal of miscellaneous literary work; but is best known by his annotated edition of the 'British Poets,' the first volume of which appeared in 1854, and which was carried through 29 volumes.

Bell, Robert, Canadian geologist: b. Toronto, Ont., 3 June 1841. He was educated at McGill and Queen's universities, and in 1867 joined the Canada Geological Survey, and in 1900 was an assistant director of it. In 1861 he was elected a member of the American Institute of Mining Engineers; in 1881 became a Fellow of the Royal Society of Canada; and in 1888-9 was a member of the Ontario Commission, which reported on the mineral resources of that province. During his connection with the geological survey, he made more extensive explorations throughout the Dominion than any other man. He was the author of about 130 reports and papers, a list of which is found in the 'Biblio of the Royal Society.'

Bell, Robert Stanley Warren, English writer, editor of 'The Captain': b. Long-Preston, Yorkshire, 27 June 1871. He has published 'The Cub in Love' (1897); 'The Papa Papers' (1898); 'Bachelorland' (1899); 'Tales of Greyhouse'; 'Love the Laggard' (1901).

Bell, Samuel, American statesman: b. Londonderry, N. H., 9 Feb. 1770; d. Chester, N. H., 23 Dec. 1850. He passed his boyhood upon his father's farm, graduated at Dartmouth College in 1793, and was admitted to practise law in 1796. He rapidly achieved distinction in his profession, and in 1804 was elected a representative to the State legislature, an office to which he was twice re-elected; and during his last two terms held the position of speaker of the house. He declined the attorney-generalship in 1807, after which he was successively a member of the State senate, and of the executive council, a judge of the supreme court, and in 1819 governor of the State. To the latter office he was re-elected four times in succession, till in 1823 he was elected to the senate of the United States, an office to which he was also re-elected. He retired from public life upon the expiration of his second term in 1835.

Bell, Samuel Dana, American jurist: b. Francetown, N. H., 9 Oct. 1798; d. 31 July 1868. He was graduated at Harvard in 1816; studied law in Exeter; and began practice in Meredith. He became a member of the legislature about 1825, and was the clerk of that body for several years. In 1830, 1842, and 1867, he was a member of the commissions appointed to revise the State 'Statutes.' In 1855 he was appointed justice of the supreme court of New Hampshire, and in 1859, became chief justice of the court, which office he held till 1864. He joined the New Hampshire Historical Society soon after its organization, and the Manchester Public Library was founded largely through his efforts.

Bell, Thomas, English zoologist: b. Poole, Dorset, 1792; d. Selborne, Hampshire, 1880. He studied medicine at Guy's and St. Thomas' hospitals, London, became a member of the Royal College of Surgeons in 1815, and soon secured a large practice as a dentist. In 1832 he was appointed professor of zoology in King's

College, London, a post which he held almost to the last. Latterly he lived for a number of years at Selborne in the residence that had belonged to the celebrated Gilbert White. His best-known separate works are his histories of 'British Quadrupeds'; 'British Reptiles'; and 'British Stalk-eyed Crustacea,' published in Van Voorst's series. In 1877 he published an excellent edition of White's 'Natural History of Selborne.'

Bell-Smith, Frederic Marlett, English artist: b. London, 26 Sept. 1846. He went to Canada in 1866, and was for seven years art director at Alma College, St. Thomas, and teacher of drawing in the public schools of London, Ont. About 1888 he became a portrait and figure painter; but he is best known as a painter of landscapes. In 1894 he produced 'Lights of a City Street,' his greatest achievement up to that year, and later, two canvases depicting incidents connected with the death of Sir John Thompson.

Bell, a hollow vessel, which, by its vibrations when struck, gives forth sounds; whence its name, from the old Saxon word *bellan*, to bawl or bellow. It is an instrument of great antiquity, being spoken of by Hebrew writers, as in Ex. xxviii., in which golden bells are prescribed as appendages to the dress of the high priest, that notice may thus be given of his approach to the sanctuary. And at this day the bell is used for a similar purpose before the priest, in Roman Catholic countries, as he proceeds to render the rite of extreme unction to the soul that is passing away; and so when the bell is tinkled, in administering the sacrament, by the same priest, it is in pursuance of a custom founded on the ancient Hebrew use of the bell. More intimately than any other instrument are bells associated with the religious and imaginative, as also with the most joyous and the saddest feelings of mankind. The metal from which bells are usually made (by founding), is an alloy, called bell-metal, commonly composed of 80 parts of copper and 20 of tin. The proportion of tin varies, however, from one third to one fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The clearness and richness of the tone depend upon the metal used, the perfection of its casting, and also upon its shape; it having been shown by a number of experiments that the well-known shape with a thick lip is the best adapted to give a perfect sound. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the body or barrel, the ear or cannon, and the clapper or tongue. The lip or sound bow is that part where the bell is struck by the clapper.

The sound of a bell is a compound tone, presenting five and in many instances more notes to the ear. There is a great difference between the harmonics of a bell and of a vibrating string. In the case of the former a minor third is not infrequently one of the loudest tones next to the fundamental tone. When a bell is properly struck the first note which attracts the attention of the ear is known as the strike note, tap note, or fundamental, and forms what is called "the" note of the bell. The low sound heard after the strike note has lost its intensity is called the hum note, and the octave above the

strike note the nominal. There are also present a minor third and a perfect fifth in the first octave, and a major third and a perfect fifth in the second octave. Very few bells agree with these conditions. Generally the hum note is a sixth or seventh, and in rare cases a ninth below the strike note. The nominal is somewhere about an octave or a ninth above the strike note, and the other notes diverge accordingly. Bells that are swung are more likely to conform to the conditions than those that are struck.

Bells were used very early in the form of cymbals and hand bells in religious services. In Egypt the feast of Osiris was announced through the ringing of bells. Bronze bells have been found in Assyria. Bells of gold were worn by Aaron and the high priests of the Jews on the border of their robes, and in Athens the priests of Cybele used them in their offerings. The Romans also used bells which they called *tintinabula*, to announce the public assemblies, and, according to Suetonius, Augustus had a bell suspended before the temple of Jupiter. In the Christian churches a similar custom early came into use, though it is not known that in the first Christian churches divine service was announced by any such method. They were used, however, in the early monasteries to announce the hours of prayer. Generally they were made of tubes struck with a hammer. They are said to have been first introduced into Christian churches about 400 A.D., by Paulinus, bishop of Nola in Campania (whence *campana* and *nola* as old names of bells); although their adoption on a wide scale does not become apparent until after the year 550, when they were introduced into France. They are rung to summon monks and choir nuns to the office, and the people to mass, to announce the Angelus, to toll during funerals, and peal on occasions of joy. They are blessed with elaborate ceremonies and consecrated or "baptized" in honor of some saint.

Until the 13th century they were of comparatively small size, but after the casting of the Jacqueline of Paris (6½ tons) in 1400, their weight rapidly increased. Among the more famous bells are the bell of Cologne, 11 tons, 1448; of Dantzic, 6 tons, 1453; of Halberstadt, 7½, 1457; of Rouen, 16, 1501; of Breslau, 11, 1507; of Lucerne, 7½, 1636; of Oxford, 7½, 1680; of Paris, 12¼, 1680; of Bruges, 10¼, 1680; of Vienna, 17¼, 1711; of Moscow (the monarch of all bells), 193, 1736; three other bells at Moscow, ranging from 16 to 31 tons, and a fourth of 80 tons, cast in 1819; the bell of Lincoln (Great Tom), 5½, 1834; of York Minster (Great Peter), 10¼, 1845; of Montreal, 13½, 1847; of Westminster (Big Ben), 15½, 1856; (St. Stephen), 13½, 1858; the great bell of St. Paul's, 17½, 1882. Others are the bells of Ghent (5), Gorlitz (10¼), St. Peter's, Rome (8), Antwerp (7¼), Olmutz (18), Brussels (7), Novgorod (31), Peking (53½).

Bells, as the term is used on shipboard, are the strokes of the ship's bell that proclaim the hours. Eight bells, the highest number, are rung at noon and every fourth hour afterward, that is, at 4, 8, 12 o'clock, and so on. The intermediary periods are indicated thus: 12:30, 1 bell; 1 o'clock, 2 bells; 1:30, 3 bells, etc., until the eight bells announce 4 o'clock, when the series recommences 4:30, 1 bell; 5 o'clock, 2

BELL-BIRD — BELLA

bells, etc. The even numbers of strikes thus always announce hours, the odd numbers half hours. See Gatty, 'The Bell: Its Origin and Uses' (1848); Lukis, 'Church Bells and Their Founders' (1857); Andrews, 'History of Church Bells' (1885); Otte, 'Glockenkunde' (1884); Tyack, 'A Book About Bells' (1899).

Bell-bird, the name given to birds in various parts of the world, which utter bell-like notes; especially the "campanero" (*Chasmorhynchus niveus*), one of the chatters of the South American family, *Contingidae*. It resembles, in form and size, the North American wax-wing, but is pure white, and has a remarkable appendage upon its forehead. This consists of a fleshy, tapering caruncle, which is black, thinly covered with star-like tufts of minute feathers. This caruncle ordinarily hangs loosely down at the side of the beak, but in moments of excitement becomes swollen and much extended, reaching a length of even five inches. This seems to be produced by air forced into its elastic tissues from the bird's lungs, and occurs whenever the characteristic notes are uttered. The bird's voice has been described by many travelers as like the sound of a loud, clear bell, which rings out over the forest at mid-day, when most other birds are silent. Waterton said: "You hear his toll and then a pause for a minute, then another toll, and then a pause again, and then another toll, and so on." Others have compared the sound to a blow upon an anvil, and all agree that it can be heard a great distance. Several other species exist in central and southern South America, all of which have caruncles, and utter extraordinary, ringing notes; but the former belief, that the loud voice was aided by these hollow appendages, is now known to be erroneous. These birds go about in small flocks, which flit through the tree-tops, and feed mainly upon forest fruits. They have been particularly studied by J. J. Quelch, a naturalist of British Guiana, an account of whose interesting investigations will be found in 'The Field' of London, for 26 Nov. 1892.

In Australia, the name "bell-bird" is given to one of the honey-suckers (q.v.), whose ching-ching is welcomed by travelers in the forest as an indication that water is near. The "bell-bird" of New Zealand is another honey-sucker (*Anthornis melanura*), whose voice, usually heard in chorus, resembles the tinkling of a silver bell.

Bell, Book, and Candle, a solemn mode of excommunication, used in the Roman Catholic Church. After the sentence is read, the book is closed, a lighted candle thrown to the ground, and a bell tolled as for one dead. See also EXCOMMUNICATION.

Bell-flower. See CAMPANULA.

Bell, Liberty, the bell in Independence Hall, Philadelphia, that was rung to announce the adoption of the Declaration of Independence by the Continental Congress. The bell was cast in London by Robert Charles, and cost about \$500. The specifications provided that it was to be made by the best workmen, to be examined carefully before being shipped, and to contain, in well-shaped letters around it, the inscription: "By order of the Province of Pennsylvania, for the State House in the City of Philadelphia, 1752." An order was given to place underneath

this the prophetic words from Leviticus xxv. 10: "Proclaim liberty throughout the land and to all the inhabitants thereof." The reason for the selection of this text has been a subject of much conjecture, but the true reason is apparent when the full text is read. It is as follows: "And ye shall hallow the 50th year and proclaim liberty throughout the land and to all the inhabitants thereof." In selecting the text the Quakers had in memory the arrival of William Penn and their forefathers more than half a century before. In August 1752, the bell arrived, but though in apparent good order, it was cracked by a stroke of the clapper while being tested. It could not be sent back as the captain of the vessel who had brought it over could not take it on board. Two skilful men undertook to recast the bell, a bell being provided which pleased very much. But it was found to be defective also. The original bell was considered too high in tone, and in an attempt to correct this fault, too much copper was added. There were a great many witticisms on account of the sound failure, and the ingenious workmen undertook to recast the bell, which they successfully did, and it was placed in condition in June 1753. On Monday, 8 July (not the 4th), at noon, true to its motto, it rang out the memorable message of "Liberty throughout the land and to all the inhabitants thereof." For years the bell continued to be rung on every festival and anniversary, until it eventually cracked 8 July 1835, while being tolled in memory of Chief Justice Marshall. An ineffectual attempt was made to cause it to continue serviceable by enlarging the cause of its dissonance and chipping the edges. It was removed from its position in the tower to a lower story, and only used on occasions of public sorrow. Subsequently, it was placed on the original timbers in the vestibule of Independence Hall, and in 1873 was suspended in a prominent position immediately beneath where a larger bell, presented to the city in 1866, now proclaims the passing hours. In 1893 it was taken to Chicago and placed on exhibition at the World's Columbian Exposition.

Bell Rock, a dangerous reef of sunken rocks on the east coast of Scotland, about 12 miles from Arbroath, and directly in the way of vessels making for the firths of Forth and Tay. The Inchcape or Bell Rock reef was long the terror of seamen, and on it numerous vessels were wrecked. At a very early period the Inchcape Rock was unhappily too well known, and tradition has it that one of the Abbots of Aberbrothock succeeded in placing a bell upon it (hence the name), in such a way as to be rung by the motion of the waves, to warn sailors of its proximity. The legend tells us that a notorious Dutch sea pirate cut the bell from the rock, and on returning with his ship laden with spoils from one of his piratical expeditions, he and his crew perished, as an old historian has it, "by the righteous judgment of God," for want of the signal which he had so wantonly removed. On this legend Southey has founded his well-known ballad of 'Sir Ralph the Rover.' The lighthouse on the rock was designed by Robert Stevenson in 1800.

Bella, Stefano Della, Italian engraver: b. Florence, 1610; d. 1664. In 1642 he went to Paris, where he was employed by Cardinal

Richelieu. Returning to Florence he became the teacher in drawing of Cosmo, the son of the great duke. It is said that he engraved 1,400 plates.

Belladon'na, or Dwale, Deadly Nightshade, (*Atropa Belladonna*), a perennial disagreeable-smelling herb of the natural order *Solanaceæ*; is a native of the region from southern Europe to India, but widely naturalized in civilized countries. It is a low, spreading plant which sometimes attains a height of six feet; has entire, ovate leaves; purple, bell-shaped, nodding axillary flowers, single or in pairs; and shining, black, sweetish berries as large as large currants. The plant has long been reputed poisonous but is used in medicine, especially by oculists, because of its property of dilating the pupil of the eye. It is said to derive its name, belladonna ('beautiful lady'), from its use as a cosmetic for distending the pupil and giving the eye a bright glistening appearance and also from the use of the juice for staining the skin. Its names, deadly night shade, and dwale (which latter is believed by some to come from the same source as the French *deuil*, sorrow, and by others from the Anglo-Saxon *dull*, because of its stupefying effects), refer to popular belief in the plant's poisonous properties. The generic name came from Atropos, the fate who cut the thread of life.

Belladonna Lily. See AMARYLLIDACEÆ

Bellaire, bēl-lār', Ohio, a city in Belmont County, on the Ohio River, and several railroads; five miles south of Wheeling, W. Va. The river is here crossed by a costly iron railroad bridge. Bellaire is the centre of a region rich in coal, iron, cement, brick, clay, and limestone, and has manufactories of stoves, glass, carriages, boilers, and foundry and machine shop products. The city has a national bank, high-grade educational institutions, daily and weekly newspapers, and an assessed property valuation of over \$3,000,000. Pop. (1900) 9,912.

Bell'mont, or Bellomont, Richard Coote (EARL OF), royal governor of New York and Massachusetts: b. 1636; d. New York, 5 March 1701. To these offices he was appointed in May 1695, but did not arrive in New York until May 1698. He went from New York to Boston in May 1699, and was received by 20 companies of soldiers and a vast concourse of people. His administration was uneventful, his time having been occupied in the pursuit of the pirates who infested the coast, one of whom, the notorious Kidd, he secured and sent to England in 1700. He was disliked by the aristocratic party in New York, but very popular in New Hampshire and Massachusetts. Hutchinson speaks of Bellamont as being a hypocrite in a pretended devotion to religion. It appears, however, that while living at Fort George, in New York, he passed much time in meditation and contrition for his youthful excesses. He was accompanied to America by his countess. See De Reyser, 'Life and Administration of Richard, Earl of Bellamont' (1869).

Bellamy, Edward, American writer: b. in Chicopee Falls, Mass., 29 March 1850; d. there, 22 May 1898. He was educated in Germany; admitted to the bar; was on the staff of the *Evening Post* of New York in 1871-2; and on his return from the Sandwich Islands in 1877,

founded the *Springfield News*. He is best known by his novel 'Looking Backward' (1888), a socialistic work, of which an immense number of copies were sold in two years. This led to the formation of Nationalist clubs, in which work Mr. Bellamy took active part. His other books are 'Six to One: a Nantucket Idyl' (1878); 'Dr. Heidenhoff's Process' (1880); 'Miss Ludington's Sister' (1884); 'Equality' (1897); 'The Duke of Stockbridge' (1901), a sequel to 'Looking Backward.'

Bellamy, Elizabeth Whitfield (CROOM), American novelist, writing under the pseudonym KAMBA THORPE: b. Quincy, Fla., 17 April 1838; d. 1900. She published 'Four Oaks' (1867); 'Little Joanna' (1876); 'Old Man Gilbert' (1888); 'The Luck of the Pendenings.'

Bellamy, George Anne, English actress: b. 1727; d. 1788. She was the natural daughter of Lord Tyrawley, by whom she was educated. Having forfeited his favor by going to live with her mother, she secured an engagement at Covent Garden in 1744, and appeared with Quin as Monimia in 'The Orphan.' Mrs. Bellamy's professional career was brilliant; but her extravagance and profligacy were notorious. In 1785, after many alternations of fortune, a free benefit released her from the debtors' prison, and in the same year she published an 'Apology' for her life.

Bellamy, Jacobus, Flemish poet: b. Flushing, 1757; d. 1786. In 1772 the second secular festival in commemoration of the foundation of the republic was celebrated throughout Holland. His genius, suddenly inflamed by the love of his native land, rendered him a poet, and his first productions met with success. He studied Latin, made himself better acquainted with his mother tongue, and composed several pieces of merit sufficient to induce the Society of Arts at The Hague to incorporate them in its collections. In 1785 he published his patriotic songs under the title 'Vaderlandsche Gezangen,' which secured him a place among the first poets of his nation. Bellamy sung likewise the praise of love. A biographical account of him has been written by G. Kniper.

Bellamy, Joseph, American clergyman and educator: b. North Cheshire, Conn., 20 Feb. 1719; d. 6 March 1790. In 1740 he became pastor of the church in Bethlehem, Conn., where he remained until his death. About 1742 he established a divinity school, in which many celebrated clergymen were trained. Among his published works, besides his 'Sermons,' are 'True Religion Delineated' (1750); 'The Nature and Glory of the Gospel' (1762), and 'The Half-Way Covenant' (1769).

Bellamy, Samuel, a notorious pirate, was wrecked in his ship, the *Whidah*, of 23 guns and 130 men, off Wellfleet, on Cape Cod, in April 1717, after having captured several vessels on the coast. Only one Indian and one Englishman escaped of his crew. Six of the pirates, who had been run ashore when drunk a few days previous, by the captain of the captured vessel, were hung in Boston in November 1717.

Bellangé, bēl-lān-zhā, Hippolyte, French painter: b. Paris 1800; d. 1866. Attention was first directed to him by his painting of 'The Return of Napoleon from Elba,' exhibited in 1834. He was director of the museum at Rouen,

BELLARMINO — BELLE ISLE

1837-53. Among his many noted battle pieces are 'Battle of Wagram' (1837); 'Kellerman's Charge at Marengo' (1847); 'Battle of the Alma' (1855); 'Assault on Malakoff' (1859); 'The Guard Dies' (1866).

Bellarmino, bĕl-lar-mĕ-nō, or **Bellarmino**, **Roberto Francesco Romolo**, Italian cardinal and celebrated controversialist: b. Monte Pulciano in Tuscany, 4 Oct. 1542; d. Rome, 17 Sept. 1621. At the age of 18 he entered the College of Jesuits, where he soon distinguished himself; and his reputation caused him to be sent into the low countries to oppose the progress of the reformers. He was ordained in 1569 by Jansenius, Bishop of Ghent, and placed in the theological chair of the University of Louvain. After a residence of seven years he returned to Italy, and was sent by Sixtus V. to France, as companion to the legate. He was made a cardinal on account of his learning, by Clement VIII., and in 1602 created Archbishop of Capua. At the elections of Leo XI. and Paul V. he was thought of for the pontificate, and might have been chosen had he not been a Jesuit. Paul V. recalled him to Rome, on which he resigned his archbishopric without retaining any pension on it as he might have done. Bellarmino had the double merit with the court of Rome of supporting her temporal power and spiritual supremacy to the utmost, and of strenuously opposing the reformers. The talent he displayed in the latter controversy called forth similar ability on the Protestant side; and for a number of years no eminent divine among the reformers failed to make his arguments a particular subject of refutation. The great work which he composed in this warfare is entitled 'A Body of Controversy,' written in Latin, the style of which is perspicuous and precise, without any pretension to purity or elegance. He displays a vast amount of Scriptural learning, and is deeply versed in the doctrine and practice of the Church in all ages. His maxims on the right of pontiffs to depose princes caused his work on the temporal power of the popes to be condemned at Paris. On the other hand, it did not satisfy the court of Rome, because it asserted, not a direct, but an indirect, power in the popes in temporal matters; which reservation so offended Sixtus V., that he placed it among the list of prohibited books. His society thought so highly of his sanctity, that proofs were collected to entitle him to canonization; but the fear of giving offense to the sovereigns whose rights he oppugned has always prevented a compliance with the ardent wishes of the Jesuits. His controversial works were published at Prague in 1721, and again at Mayence in 1842. Of his other works the most important is his 'Christianæ Doctrinæ Applicatio' (1603)—a work originally composed in Italian, but since translated into all European languages. He left an autobiography, which was re-issued and annotated by Dollinger and Reusch (1887).

Bellary, bĕl-lā're, or **Ballari**, a town in India, in the presidency of Madras, capital of a district of the same name, 280 miles northwest of Madras. It is the headquarters of the troops belonging to the districts of Bellary and Kadapa, and possesses two forts, one built on the summit, and the other on a lower eminence of a huge granite rock about two miles in circumference, and rising to the height of about 450

feet from the ground. Bellary is the terminus of a branch line of the Madras Ry., and carries on an active trade in cotton. Pop. (1901) 57,700

Bellay, bĕ-lā, **Joachim du**, distinguished French poet, known as the French Ovid: b. about 1524; d. 1560. He joined Ronsard, Daurat, Jodelle, Belleau, Baif, and De Tisard in forming the "Pleiad," a society, the object of which was to bring the French language on a level with the classical tongues. Bellay's first contribution was 'La Défense et Illustration de la Langue Française.' His chief publications in verse are 'Recueil de Poésie'; a collection of love-sonnets called 'L'Olive'; 'Les Antiquités de Rome,' a series of sonnets; 'Les Regrets'; and 'Les Jeux Rustiques.' In 1555 he became canon of Notre Dame, and a short time before his death he was nominated archbishop of Bordeaux. A statue of Bellay was unveiled in Ancenis in 1894. Spencer translated some of his Roman sonnets into English; and there are translations of poems by him in Andrew Lang's 'Ballads and Lyrics of Old France' See 'Life' by Seche' (1880); Pator, 'Studies in the History of the Renaissance' (1888).

Belle-Alliance, bĕl-a-le-ans, a farm 13 miles south of Brussels, famous as the position occupied by the centre of the French army in the battle of Waterloo, 18 June 1815. By the Prussians the battle was called that of Belle Alliance.

Belle Chocolatière, bĕl-shō-kō-la-tyār, **La**, a noted portrait by the artist Liotard of the Princess Dietrichstien, who, prior to her marriage, was a waitress in a café in Vienna. The painting is now in the Dresden Gallery.

Belle-Isle, bĕl-el, or **Belle-Isle-en-Mer** (anciently **VINDILIS**), an island in the Bay of Biscay, belonging to France, in the department of Morbihan, eight miles south of Quiberon Point, about 11 miles long, and 6 miles across at the widest point. The soil is diverse, consisting of rock, salt marsh, and fertile grounds. Palais is the capital. The island is of much interest historically. In 1747 the French fleet was defeated by Admiral Hauke off the island, and it was captured by the English in 1761. Pilchard and sardine fishing is the important industry. Pop. 10,000.

Belle-Isle, an island, 15 miles north of Newfoundland and northeast of the Gulf of St. Lawrence, about 21 miles in circuit. On the northwest side it has a small harbor, called Lark Harbor, within a little island close to the shore. At the eastern point it has another small harbor or cove that will only admit fishing shallops. A rescue station has been established for persons who may be shipwrecked. Its area is about 15 square miles. At its southern end is a lighthouse whose light is 470 feet above the sea, and visible for 28 miles. The narrow channel between Newfoundland and the coast of Labrador is called the Straits of Bell-Isle. Steamers from Glasgow and Liverpool to Quebec round the north of Ireland commonly go by this channel in summer as being the shortest route.

Belle Isle, Va., an island in the James River, opposite Richmond, where nearly 12,000 Federal prisoners were confined in 1863.

BELLE JARDINERE — BELLEROPHON

Belle Jardinère, bĕl-zhâr-dĕ-nyâr, **La**, a celebrated painting by Raphael, now in the Louvre. It represents the Madonna with the holy child, and the infant St. John.

Belle Plaine, Iowa, town in Benton County, on the Iowa River and on several railroads; 257 miles west of Chicago. It has flouring mills, furniture factories, creameries, machine shops, broom factories and numerous oil wells. It was founded in 1862. Pop. (1900) 3,283.

Belle Savage, an old inn, on Ludgate Hill, London, celebrated in coaching days, and frequently mentioned by Dickens and other writers dealing with that period.

Belleau, bê-lô, **Rémy**, French poet: b. Nogent-le-Rotrou, 1528; d. Paris, 16 March 1577. He made an elegant and spirited translation of 'The Odes of Anacreon' (1576). His 'Bergerie' (1572), a compound of prose and verse, is of unequal merit; but it contains some passages,—for example, the "April,"—which are of great beauty.

Bellefontaine, Ohio, a city and county-seat of Logan County; on the Cleveland, C. C. & St. L. R.R.; 57 miles northeast of Dayton. It occupies the highest elevation in the State; and is surrounded by an agricultural region. It has extensive car-shops and other railroad works; two national banks; daily and weekly newspapers; an assessed property valuation of \$2,250,000; a total debt of about \$200,000. Pop. (1900) 6,649.

Bellefonte, Pa., a borough and county-seat of Centre County, 87 miles northwest of Harrisburg. It has important lime quarries, iron furnaces, glass works, manufactories and machine shops, and was incorporated in 1800. It is a summer resort much visited for its scenery and noted for its spring, whose waters have supplied the borough since 1807. Pop. (1900) 4,216.

Bellegarde, bĕl-gard, **Henri** (COUNT DE), French writer. b. Piræ, 30 Aug. 1648; d. Paris, 1707. He was a member of the community of priests of St. Francis de Sales, and the recognized author of the 'Universal History of Voyages' (1707).

Belleisle, bĕl-êl, **Charles Louis Auguste Fouquet** (COMTE DE), marshal of France: b. Villefranche, 22 Sept 1684; d. Versailles, 26 Jan. 1761. He distinguished himself during the famous siege of Lille, and became brigadier in the royal forces. After the conclusion of the war of the Spanish Succession he went with Marshal Villars to Rastadt, where he displayed diplomatic talents. The cession of Lorraine to France in 1735 was principally his work. Cardinal Fleury reposed confidence in him; Louis XV. made him governor of Metz and the three bishoprics of Lorraine, which office he held until his death. Before the breaking out of the war in 1741 he visited the principal courts of Germany with the design of disposing them, after the death of Charles VI., to choose the elector of Bavaria emperor of Germany; and he displayed so much address on this occasion as to excite the admiration of Frederick II. After his return he placed himself at the head of the French forces sent to oppose those of Maria Theresa. He took Prague by assault; but, the king of Prussia having made a separate peace, he was compelled to a retreat which he per-

formed with admirable skill. In December 1744, when on a diplomatic journey to Berlin, he was arrested in Germany and sent to England, but he was exchanged in 1746. In the following year he forced Gen. Browne, who had entered the south of France from Italy, to raise the siege of Antibes and to retreat over the Var. In 1748 the king made him a duke and peer of France, and the department of war was committed to his charge. He reformed the army by abolishing many abuses, enlarged the military academy, and caused an order of merit to be established.

Bellenden, William, Scottish writer: b. Lasswade (?) Midlothian, about 1555; d. about 1633. He was educated at Paris, where he was professor of belles-lettres in 1602; and though he was made master of requests by James I. he still continued to reside in the French metropolis. He was distinguished for the elegance of his Latin style, and in 1608 he published a work entitled 'Ciceronis Princeps,' containing a selection from the works of Cicero, consisting of passages relating to the duties of a prince, etc. He afterward published 'Ciceronis Consul,' 'Senator,' etc., with two other treatises, from one of which Conyers Middleton's 'Life of Cicero' was largely compiled—a plagiarism denounced by Dr. Parr in a Latin preface prefixed to a re-issue of Bellenden's writings (1787).

Bellermann, Ferdinand, German painter: b. Erfurt, 14 March 1814; d. Berlin, 11 Aug. 1889. He was educated at the academy at Weimar, and studied later at Berlin under Karl Blechen and Wilhelm Schirmer. He traveled in Norway, the Netherlands, Venezuela, and Italy, and in 1866 became professor of landscape painting at the Berlin Academy. He utilized the results of his travels in the production of many magnificent landscapes, among which may be mentioned 'Evening in the Valley of Caracas'; the 'Guacharo Cave, Venezuela'; 'Sierra Nevada'; etc.

Bellerophon, bĕl-lĕ-rô-fôn, son of Glaucus, king of Ephyre, by Eurymede, at first called Hipponous. The murder of his brother, whom some call Alcimenus and Bellerus, procured him the name of Bellerophon, or murderer of Bel-lerus. After this murder Bellerophon fled to the court of Proetus, king of Argos, whose wife became enamored of him; and because he slighted her passion she sought to destroy him. He escaped her machinations, was introduced to the court of Jobates, king of Lycia, and, after a number of adventures, in one of which he conquered the Chimæra, he married the daughter of Jobates and succeeded to the throne of Lycia. The latter days of Bellerophon were unfortunate. Attempting to soar to heaven on the back of Pegasus, Zeus sent a hornet which so stung his winged steed that he cast his rider to the earth, where lame and blind he wandered lonely in the Aleian fields, a prey to corroding grief and melancholy, shunning men, and hated by the gods.

Bellerophon, a genus of gasteropodous mollusks, typical of the family *Bellerophontidae*. The species are all fossil shells found in the limestones of the Silurian, Devonian, and Carboniferous periods. The best-known American species are found in the coal measures of the Mississippi valley and the southwest. The so-

called *B. cilobatus*, a fossil characteristic of the Trenton formation, is now assigned to the genus *Protowarthia*.

Belles-lettres, bĕl-lĕtr, the French term, for which the English equivalent is polite literature. It is impossible to give a satisfactory explanation of what is or has been called belles-lettres; in fact, the vaguest definition would be the best, as almost every branch of knowledge has at one time been included in, at another excluded from, this denomination. The most correct definition, therefore, would be, perhaps, such as embraced all knowledge and every science not merely abstract or simply useful. In the division of the departments at the Lyceum of Arts, established at Paris in 1792, the belles-lettres comprehended general grammar, languages, rhetoric, geography, history, antiquities, and numismatics; while philosophy, mathematics, etc., were called, in contradistinction, sciences. If the name of belles-lettres ought to be retained at all, it would seem proper to include under it poetry, rhetoric, and all prose which has pretensions to elegance.

Belleval, Pierre Richer de, bĕl-val, pĕ-är rĕ-châ dé, French botanist: b. Chalons-sur-Marne c. 1564; d. 1623. He was the first person in France who taught botany as a science distinct from medicine. Henry IV. established a botanical garden at Montpellier, and created a chair of botany. Belleval obtained the first appointment in 1593, and immediately began a collection of all the plants in Languedoc, in order to the production of an illustrated flora, for which about 500 quarto plates had been engraved, when he died before the work could be published. Through the carelessness of his representatives, who sold the plates, almost the whole fruit of his labors was lost.

Belleville, bĕl-vĭl, Canada, town, port of entry, and county-seat of Hastings County, Ont., on the Bay of Quinte, at the mouth of the Moira River; and on the Grand T. and Midland R.R.'s; 60 miles west of Kingston. It has an excellent harbor and abundant water power; is in direct steamboat communication with many United States and Canadian points; is principally engaged in manufacturing and commerce; and is a popular summer resort. It is the seat of a United States consulate, and of Albert University (Methodist Episcopal), which comprises Albert College for men, and Alexandra College for women; and in the suburbs is a large deaf-and-dumb asylum. The city has churches, convent, and daily and weekly newspapers. Pop. (1900) 9,117.

Belleville, bĕl-vĕl, France, a northeastern suburb of Paris, now included within the municipal limits.

Belleville, Ill., a city and county-seat of Saint Clair County; situated on several railroads; 14 miles east of Saint Louis, Mo. It is in the midst of very productive coal mines; has a large trade in flour, and general produce; and is chiefly engaged in the manufacture of glass, stoves, flour, nails, and machinery, and has one of the largest rolling mills in the West. The city has trolley lines to Saint Louis, a public library, Saint Peter's Cathedral (Roman Catholic), convent, four national banks, and an assessed property valuation of over \$2,250,000. Pop. (1900) 17,484.

Bellevue, Ky., a city on the Ohio River opposite Cincinnati, of which it is practically a suburb. It is almost exclusively a city of residences. Pop. (1900) 6,332.

Bellevue, bĕl-view, Ohio, a village on Lake S. & M. S., Wheeling & L. E., and Nickel P. R.R.'s; situated in Huron and Sandusky counties; about 16 miles south of Sandusky. It has manufactures of agricultural implements, and a large farming trade. Pop. (1900) 4,100.

Bellevue, bĕl-vù (French, "fine prospect"), a name given to various villas and palaces, but particularly to a beautiful country palace in the neighborhood of Paris, situated on a ridge of hills stretching from St. Cloud toward Meudon. It was built by Mme. de Pompadour, commenced in July 1748, and finished in November 1750. The first French artists of the time had exerted all their talents in embellishing it; so that at the period when it was built, it was considered the most charming in all Europe. After the Revolution the Convention decreed that Bellevue should be kept in repair at the expense of the nation, and devoted to public amusements. Nevertheless it was publicly sold during the highest pitch of revolutionary excitement, and the purchaser had it demolished. There is a pretty village on its site, which, during the siege of Paris (1870-1) was an important strategic point.

Bellevue Hospital, New York, a hospital situated on the East River, between 26th and 27th streets. It is the seat of a medical school of high rank, and has accommodations for about 1,300 patients.

Belley, bĕl-lâ, France (ancient *BELLICA*), a town in the department Ain, 39 miles southeast of Bourg, and 38 miles southwest of Geneva; situated in a fertile valley watered by the Furan. It is very ancient, having been a place of note in the time of Julius Cæsar, and is the seat of a bishopric founded in 412. It contains a communal college, has an agricultural society, and a court of primary resort. The episcopal palace, the belfry of the cathedral, the college, and the rich cabinet of medals and antiquities, are worth notice. Silk worms are reared; and lithographic stones, reckoned the best in France, are obtained from quarries in the neighborhood. Pop. (1896) 6,070.

Belli, Giuseppe Gioachino, bĕl'lĕ, joo-sĕp'pĭ jō-kĕ'nō, Roman humorist and satirical poet: b. 1791; d. 1863. He wrote in the popular dialect of the Trastevere; and in early life scourged the papacy and the clergy with stinging, irreverent, and often vulgar satire. Becoming afterward a zealous convert to the Roman faith, he endeavored to call in and destroy the indiscretions of his youth. In his last years he published a beautiful translation of the Roman Breviary. His published sonnets amount to more than 2,000; his other published Italian verses fill four considerable volumes; while two thirds of his vast remains have never been gathered and edited. Of this last, much is clothed in language too coarse to bear the light of modern culture.

Belliard, Augustin Daniel, bĕl-yâr, ô-goos-tân dan-vĕl (COUNT DE), French soldier and diplomatist: b. Fontenay-le-Comte, La Vendée, 1769; d. 27 Jan. 1832. He entered the military service very early, and Dumouriez soon made

BELLIGERENT — BELLINI

him an officer of his staff. Under Napoleon, serving in Egypt, Germany, Spain, and Russia, he rose to great military distinction. After the emperor's abdication he received the order of Saint Louis from Louis XVIII. and was made a peer and major-general of the French army.

Belligerent, a nation or a large section of a nation engaged in carrying on war. When a revolted party of great numerical strength are able to form a regular government and rule over the whole or part of the territory which they claim, humanity dictates that they should not be treated as rebels guilty of treason, but should, if captured, be regarded as prisoners of war. To attain this result it is needful for those who have risen in arms against the government to make every effort to obtain for their party the position of belligerents. In the contest between the Federals and Confederates in the War of 1861-5, the latter section of the American people, at the very commencement of the struggle, claimed the privileges of belligerents. Their demand was promptly acceded to by the British government, at which the Federal authorities took umbrage, contending that the recognition had been premature, while the British maintained that it could not have been refused or delayed.

Bellingham, Richard, royal governor of Massachusetts: b. 1592; d. 7 Dec. 1672. He emigrated to the colony in 1634; in 1635 was made deputy-governor; and in 1641 was elected governor in opposition to Winthrop by a majority of six votes. He was re-elected in 1654, and after the death of Endicott was chosen again in May 1665, and continued in the executive chair of the colony as long as he lived, having been deputy-governor 13 and governor 10 years. He was chosen major-general in 1664, in which year the king sent Nichols, Cortright, Coon, and Moresick as commissioners to inquire into the state of the colony, when, according to Hutchinson, Bellingham and others obnoxious to James II. were required to go to England to account for their conduct. The general court, however, refused obedience and maintained the authority of the charter. His wife having died, in 1641 he married a second time, of which a contemporary speaks thus: "A young gentleman was about to be contracted to a friend of his, when on a sudden the governor treated with her, and obtained her for himself." The banns were not properly published, and he performed the marriage ceremony himself. He was prosecuted for a violation of the law, but at the trial he refused to leave the bench, sat and tried himself, and thus escaped all punishment. In his last will he provided that after the decease of his wife and of his son by a former wife, and his granddaughter, the bulk of his estate should be spent for the yearly maintenance "of goodly ministers and preachers" of the true Church, which he considered to be that of the Congregationalists. This will the general court set aside on the ground that it interfered with the rights of his family. A sister of his, Anne Hibbens, was executed at Salem in June 1656, during the witchcraft persecution.

Bellingham, Wash., city, county of Whatcom; on the eastern shore of Bellingham Bay, and on the Great Northern, Northern Pacific, Canadian Pacific, and Bellingham Bay & British Columbia R.R.'s.

History.—The first settlement was made in October 1852 by Capt. Henry Roeder, who built a saw-mill on what is now Whatcom Creek. The Lummi tribe of Indians maintained their chief camp on the beach near the mouth and falls of Whatcom Creek, and called the camp or rather the locality "*Whrap-cop*," meaning "the noisy water" or "the place of the noisy water." The white men retained the Indian name for their town, modified as indicated by the spelling to Whatcom. This remained the name of the town until the consolidation of Whatcom and New Whatcom in 1891 under the name of New Whatcom, from which the prefix "New" was dropped by action of the state legislature 19 Feb. 1901. Fairhaven is the English interpretation of an Indian word or phrase, "*See-see-leechel*," meaning "a safe harbor" or "the sheltered beach." The town was platted and named in 1883 by Daniel J. Harris, the original donation claimant. In 1890 Fairhaven and the adjoining town of Bellingham were incorporated as one city under the name of Fairhaven. On 27 Oct. 1903, the electors of Fairhaven and Whatcom voted to consolidate the two cities under the name of Bellingham and the consolidation was duly consummated. The new name went into effect 28 Dec. 1903, and the post-office became Bellingham 1 April 1904. Bellingham Bay was named by Vancouver in 1792, and the consolidated city takes its name from that bay.

Industries.—The city is the commercial centre of a large lumber and agricultural region; salmon fishing is also an industry of great importance, and mining and quarrying are carried on in the vicinity. The principal manufacturing establishments include lumber and shingle mills, salmon canneries, wood working and iron working plants, and brick kilns. There are four banks with a combined capital of \$405,000.

Churches and Educational Institutions.—There are (in 1904) 27 established churches in Bellingham, representing practically all denominations. There are 11 city schools, including a high school, and two libraries, the Bellingham Bay Library, and the Carnegie Library. The city also contains the State Normal School, and three business colleges.

Government and Population.—The government is vested in a mayor, elected biennially, and a council of seven members, elected alternately every two years. Pop. (Official census 1904), 22,632.

FRANK C. TECK,

Bellingham Chamber of Commerce.

Bellini, Gentile, jën-tě'lā, the elder son of Jacopo (q.v.): b. 1421; d. 1501. He became much more distinguished than his father, but did not rival his younger brother, Giovanni. His fame attracted the notice of Mohammed II, conqueror of Constantinople, and Bellini visited the grand seignor, being sent by the Senate. He painted a number of pictures for Mohammed, and also struck a medal for him, with all of which he was greatly pleased, and rewarded the painter by presenting him with a gold chain and 3,000 ducats. A story is told of his exhibiting to Mohammed a picture he had painted of the head of John the Baptist in a charger, and the emperor, who had certainly great experience in decapitation, observing that the muscles of the neck were not correctly drawn, sent for a slave and had his head cut off in the presence of the artist, to convince him

of his mistake. Voltaire ridicules this tale, and Gibbon altogether rejects it. There is a very fine pen-and-ink drawing by Bellini in the British Museum, representing Mohammed and the sultana mother, in whole-length figures in a sitting position. After Gentile's return to Venice, he continued to paint, honored by the patronage of the state and of private individuals, until his death.

Bellini, Giovanni, bēl-lē'nē, jo-vā-ni, Italian painter: b. 1426; d. Venice, 29 Nov. 1516. He was the second son of Jacopo Bellini (q.v.) and generally regarded as the founder of the Venetian school, though he himself was his father's pupil. Some of his earliest works were portraits, among them that of the doge, Leonardo Loredano, now, with another of his masterpieces, 'Peter Martyr,' in the London National Gallery. Having attracted the notice of the government, he was employed by the republic to decorate the great hall of the council with a series of magnificent paintings, covering the entire walls, and designed to represent the proudest historic glories of Venice. These were worthily accomplished, but were destroyed by a fire. Among his scholars were Giorgione and Titian, and it was from him that these masters acquired their magnificent coloring.

Bellini, Jacopo, ya'cō-pō, Italian painter: b. Venice about 1405; d. 1470. He was a pupil of Gentile da Fabriano, and is said to have been taught oil-painting, which was then a secret, by Andrea dal Castagno, and in turn taught it to his sons Gentile and Giovanni (qq.v.). The first works by which he acquired fame were portraits of Catharine Cornaro, the beautiful queen of Cyprus, and one of her brothers; a picture representing the passion of Christ, in which many figures were introduced, himself among the number; and a historical picture representing a Venetian legend of the miracle of the cross. This cross, containing a piece of the true one on which the Saviour died, was by some accident thrown into the Grand Canal at Venice, and although many persons plunged in after it, it was the will of God that only the guardian of the brotherhood to whom the cross belonged, Andrea Vindramino, could take it out again. This event was represented in the painting. Almost all of Jacopo's works have perished; one supposed to be authentic is in the Manfrini palace at Venice and represents the portraits of Petrarch and Laura.

Bellini, Vincenzo, vīn-chēn'zō, Italian composer: b. Catania, Sicily, 1802; d. near Paris, 1835. He was educated at Naples under Zingarelli, commenced writing operas before he was 20, and composed for the principal musical establishments in Europe. His most celebrated works are 'Norma,' 'I Puritani,' and 'La Sonnambula.' He is remarkable chiefly for sweetness of melody, suitability of harmony, and an adaptation of sound to sense, and stood honorably distinguished from many of his profession by the excellence of his moral character.

Bellinzona, bēl-in-zō'nā, or **Belleny**, bēl-ā'nē, Switzerland, the capital of the canton of Ticino on the left bank of the Ticino, about five miles from its embouchure in the northern end of Lago Maggiore. It occupies a position of great military importance.

Bellis. See DAISY.
Vol. 2—35

Bellman, Karl Mickel, Swedish poet: b. Stockholm, 1740; d. 1795. He grew up in the quietude of domestic life, and the first proofs he gave of his poetical talents were religious and pious effusions. The dissipated life of young men at Stockholm devoted to pleasure was afterward the subject of his poems. By these his name was spread over all Sweden. Even the attention of Gustavus III. was attracted to him, and he received from the king an appointment which enabled him to devote himself almost entirely to poetical pursuits, in an easy independence, until his death. His songs are truly national, and love and liquor their most common themes.

Bello, Andres, Spanish-American diplomatist and author: b. Caracas, Venezuela, 30 Nov. 1780; d. Santiago, Chile, 15 Oct. 1865. He represented Venezuela in London, 1810-28; in 1829 became an official of the bureau of finance; in 1834 was minister of foreign affairs for Chile; in 1842, the first rector of Santiago University. He was the author of 'Principles of International Law' (1832), and after his death his entire works were printed at the expense of the state.

Belloc', Hilare, English litterateur: b. 27 July 1870. He is the son of M. Louis Belloc, a French barrister; married to Bessie Rayner Parks, a well-known English author, and was educated at Balliol College, Oxford, after serving for a time in the French artillery at Toul. He has published 'The Bad Child's Book of Beasts' (1896); 'More Beasts for Worse Children' (1897); 'The Modern Traveler' (1898); 'The Moral Alphabet' (1899); 'Danton,' a much-admired biography (1899); 'Lambkins Remains' (1900); 'Paris' (1900); 'Robespierre' (1901); 'The Path to Rome,' a delightful volume of pedestrian travels (1902).

Belloc, Marie Adelaide. See LOWNDES, M.A.

Bellomont, Earl of. See BELLAMONT, RICHARD, EARL OF.

Bellomont, Earl of. See COOTE, RICHARD.

Bello'na, the goddess of war, daughter of Phorcys and Ceto. She was called by the Greeks *Enyo*, and is often confounded with Minerva. She was anciently called *Duellona*, and was the sister of Mars, or, according to some, his daughter or his wife. She prepared his chariot when he was going to war, and drove his steeds through the tumult of the battle with a bloody scourge, her hair dishevelled and a torch in her hand. The Romans paid great adoration to her; but she was held in the highest veneration by the Cappadocians, chiefly at Comana, where she had above 3,000 priests. Her temple at Rome was near the Porta Carmentalis. In it the senators gave audience to foreign ambassadors and to generals returned from war. At the gate was a small column, called the "column of war," against which they threw a spear whenever war was declared. The priests of this goddess consecrated themselves by making great incisions in their bodies, and particularly in the thigh, from which they received the blood in their hands to offer as a sacrifice to the goddess. In their wild enthusiasm they often predicted bloodshed and wars, the defeat of enemies, or the besieging of towns.

Bellet, Joseph René, bēl-lō, zhō-sef rē-nā, French naval officer: b. Paris, 1826; d. 1853. At the age of 16 he entered the naval academy at

BELLOT STRAIT—BELLOY

Brest, and two years afterward received a commission as *élève de marine* on board the *Berceau*. He was promoted for bravery to the rank of *élève* of the first class, and also created a chevalier of the Legion of Honor, though not yet 20 years old. On his return to France in 1847 he was made a sub-lieutenant, and shortly after a two-years' voyage to South America in the *Triomphante* he volunteered his services on the Royal Albert schooner, fitted out by Lady Franklin, in June 1851, to search for her husband, Sir John Franklin. The expedition failed in its main object, but an interesting journal of it, kept by Bellot, was published after his death. In June 1853, he sailed again on board the *Phoenix*, under command of Capt. Inglefield, on a new Arctic expedition, the principal object of which was to convey dispatches to Sir Edward Belcher, then commanding H.M.S. *Assistance* in the Polar seas. Arrived in Erebus and Terror Bay, where lay the *North Star*, whose commander, Capt. Pullen, was absent on a journey of discovery, Capt. Inglefield set out in search of him; but in his absence it became desirable to get the despatches conveyed to Sir Edward Belcher—a duty which Lieut. Bellot undertook to perform by crossing the ice. Having set out with four sailors, a canoe, and a sledge, the party got separated in a gale of wind on 18 August, and Bellot, with two others, drifted away on a piece of ice. With the view of ascertaining the direction the ice was taking, he crossed over to the opposite side of the hummock and was never seen more. A handsome granite obelisk was erected to his memory in front of Greenwich Hospital, and a provision was made for his sisters.

Bellot Strait, the passage on the north coast of North America which separates North Somerset from Boothia Felix and connects Prince Regent Inlet with Franklin Channel. Its eastern entrance was discovered in 1852 by Lieut. Bellot (q.v.). After four unsuccessful attempts it was explored for the first time by McClintock on his crowning voyage. It is about 20 miles long, and, at its narrowest part, about one mile wide, running nearly on the parallel of 72°, between granite shores which, everywhere high, rise here and there to 1,500 or 1,600 feet. Through this funnel both the winds and the waters have full play; the latter, permanent currents and flood tides alike, coming from the west. A point on the southern shore, 71° 55' N, 95° W, is the most northerly point of the North American continent.

Bellotto Bernardo, Italian painter and engraver: b. Venice, 1724; d. Warsaw, 1780. He studied under his uncle, Antonio Canal, and painted perspective and architectural views. He passed much time in Germany and was a member of the Academy of Dresden, where many of his pictures are exhibited. He etched, from his own designs, views of Vienna, Dresden, and Warsaw. His pictures are called by the name of CANALETTO, which he assumed.

Bellows, Albert F., American painter: b. Milford, Mass., 20 Nov. 1829; d. 24 Nov. 1883. He was one of the first to succeed with water-colors. He studied in Antwerp, Paris, and England, becoming a National Academician (1861), and an honorary member of the Royal Belgian Water Color Society (1868).

Bellows, Henry Whitney, American Unitarian clergyman and writer: b. Walpole, N. H., 11 June 1814; d. 30 Jan. 1882. He became pastor of All Souls Church, New York, 1839; was chief founder and long editor of the 'Christian Inquirer' (1846); chief originator of the United States Sanitary Commission, and its president during the Civil War (1861-5). He wrote 'Public Life of Washington' (1866); 'Relation of Public Amusements to Public Morality'; 'The Old World in Its New Face' (2 vols. 1868-9), a record of travel in Europe. He was an effective preacher and public speaker.

Bellows, a machine for blowing fire, so formed as, by being dilated and contracted, to inhale air by an orifice which is opened and closed by a valve, and to propel it through a tube upon the fire. The invention of bellows is ascribed to Anacharsis the Scythian, though probably it took place in different countries. The forms of bellows at present are very various, as many attempts have been made for the improvement of this highly important machine, which becomes necessary wherever a powerful flame is required in the arts. As mining was carried on at an early date in Germany, and great heat is required in smelting the ores and working the metals, various new kinds of bellows were invented in that country, one of which consists of an empty box, which moves up and down in another, partially filled with water. Between the bottom of the empty box and the surface of the water is a space filled with air, which is driven out by the descent of the enclosed box. Bellows of very great power are generally called blowing-machines (q.v.). The common Chinese bellows consist of a box of wood about two feet long and one foot square, in which a thick, square piece of board, which exactly fits the internal cavity of the box, is pushed backward and forward. In the bottom of the box, at each end, there is a small conical or plug valve to admit the air, and valves above to discharge it.

Bellows Falls, Vt., a town in Windham County, on the Connecticut River, so called from several rapids and cataracts occurring there. The whole descent is about 44 feet. It was formerly a famous place for spearing salmon. A canal with locks has been cut around the falls, through the solid rock. The scenery is romantic, and various interesting minerals are found in the vicinity. The town contains several mills and manufactories, and is remarkable for its handsome dwellings. Pop. (1900) 4,337.

Bellows-fish. See GLOBE-FISH.

Belloy, Pierre Laurent Buirette de, bël-lwä, pë-är lör-ön bwë-rët de, French dramatist: b. St. Flour, Auvergne, 17 Nov. 1727; d. 5 March 1775. The first French dramatist who successfully introduced native heroes upon the French stage. He was designed by his uncle, a distinguished advocate in the parliament of Paris, who reared him after his father's death, for his own profession, but while he applied himself to the law with reluctance, he showed much genius for the drama. His uncle opposed this taste, and the young man secretly left his house. He next made his appearance as an actor under the name of "Dormont de Belloy." Belloy had hoped to reconcile his family to him by the success of his first tragedy, 'Titus,' but this hope was disappointed by the failure of the

BELL'S PALSY—BELMONTET

piece; and the author went to St. Petersburg. He returned to France, where he brought out his tragedy 'Zelmire,' which met with complete success. In 1765 followed his 'Siege of Calais,' a tragedy which produced a great sensation, and is still esteemed, though it owes the applause bestowed on it rather to its subject than to its poetical merit. He received the medal promised by the king to those poets who should produce three successful pieces, and which was awarded on this occasion only, the 'Siege of Calais' being counted as two, it being, in fact, only the second successful piece of Belloy. The city of Calais sent him the freedom of the city in a gold box. Belloy wrote sundry other dramatic pieces, of which 'Gaston and Bayard' procured his reception into the Academy.

Bell's Palsy, named after Sir Charles Bell (q.v.), a palsy of the muscles of the face supplied by the seventh or facial nerve, and due to some peripheral lesion, in distinction to facial palsy of a central, or of a nuclear origin. It may occur on both sides of the face. The causes are many, but exposure to cold, such as sleeping in the open with the wind blowing over the face, or sitting by an open window in a railway train or steamboat, is one of the most frequent causes. It may also occur in a multiple neuritis that is due to poisoning by alcohol, lead, arsenic, or the poison of diphtheria, etc., and in rare instances from fractures of the skull. It comes on suddenly, the patient often waking in the morning to find one side of his face stiff, and in two or three days the palsy has developed. There is a sense of discomfort on the paralyzed side. The patient cannot close one eye completely and cannot manage his food on the affected side. He cannot whistle, and his speech is peculiar. The wrinkles of the paralyzed side are smoothed out and every motion of the facial muscles seems to be an exaggerated one, so that many patients say their face is drawn to one side. The reality being that it is the opposite side that is affected and immovable. The paralysis usually gets well in from three to five months, especially if the treatment is begun early and perseveringly followed out. Some patients never entirely recover, although much improvement takes place in practically all. The treatment is electrical, massage, and general tonics. Particular attention should be paid to the care of the paralyzed eyelid. See also FACIAL PARALYSIS.

Consult: Starr, 'Text-book of Organic Nerve Diseases' (1903).

Belluno, Italy, a northern city, capital of a province of the same name, on the Piave, 48 miles north of Venice. It has a cathedral, a handsome theatre, etc.; and manufactures of silk, straw-plait, leather, etc. Pop. (1897) 18,348.

Bel'mont, August, American banker: b. Alzey, Germany, 1816; d. 24 Nov. 1890. He was educated at Frankfurt, and was apprenticed to the Rothschild's banking house in that city when 14 years old. In 1837 he went to Havana to take charge of the firm's interests, and soon afterward was sent to New York, where he established himself in the banking business and as the representative of the Rothschilds. He was consul-general of Austria 1844-50; became charge d'affaires at The Hague in 1853; and was minister-resident there in 1854-8. He was

a delegate to the Democratic National Convention in 1860, and when a portion of the delegates withdrew and organized the convention in Baltimore he was active in that body, and through it became chairman of the National Democratic Committee, an office he held till 1872. He was an active worker in the party till 1876, when he closed his political career.

Belmont, August, American banker: b. New York, 18 Feb. 1853; son of the preceding. He was graduated at Harvard University in 1875; at once entered his father's banking house, and on the death of his father became head of the firm of August Belmont & Company, also representing the European banking firm of the Rothschilds. In February 1900 he organized the Rapid Transit Subway Construction Company to back John B. McDonald, who had been awarded the \$35,000,000 contract for the construction of a rapid-transit system in New York. The house, under the management of the son, has continued to exert the large influence in the financial and railroad affairs of the city and country that it gained under its founder.

Belmont, Perry, American lawyer: b. New York, 28 Dec. 1851 (son of August Belmont 1816-90). He was graduated at Harvard University in 1872, and at Columbia College Law School in 1876; was admitted to the bar and practised in New York till 1881, when he was elected as a Democrat to Congress and served till 1887, being a member of the Committee on Foreign Affairs, and in that capacity, in his first term in Congress, came into notice by his cross-examination of J. G. Blaine, then ex-secretary of state, as to his relations with a syndicate of American capitalists interested in Peruvian guano. In 1885 he was appointed chairman of the Committee on Foreign Affairs, and in 1888 United States minister to Spain. In 1889 he was commissioner to the Universal Exposition in Paris, and for his services received from the President of France, in 1890, the decoration of commander of the Legion of Honor. He was one of the principals in the rapid-transit contract in New York, in which his brother August (q.v.) was interested.

Belmont, Cape Colony, a town midway between Orange River Junction and Kimberley. It was the scene of one of the earliest engagements in the war of 1899-1900, between the Boers and the British under Gen. Lord Methuen. The town was attacked by the British on 23 Nov. 1899, while on the march to the relief of Kimberley, and the battle resulted in a victory for them. Two days later Lord Methuen took Graas Pan, 10 miles north of Belmont, after again defeating the Boers.

Belmont Park, N. Y., a racing field on Long Island, 15 miles from New York city, probably the most magnificent establishment devoted to horse-racing in the world. The park covers an area of 666 acres, laid out in groves and gardens, among which are placed the palatial club buildings and stables.

Belmontet, bēl-mōn-tā, Louis, French poet and publicist: b. Montauban, 26 March 1799; d. Paris, 14 Oct. 1879. He studied and practised law in Toulouse until involved in difficulties with the magistracy on account of some satirical poems, when he went to Paris and there produced his principal works: 'The Sad Ones'

(1824), a cycle of elegies; 'The Supper of Augustus' (1828); and with Soumet, 'A Festival of Nero' (1829), a tragedy which exceeded 100 performances. In 1830 he edited the *Tribune* newspaper, opposed the accession of Louis Philippe, and predicted his downfall and a second revolution in a bold pamphlet addressed to Chateaubriand, for which he was arrested. In 1839 he established, together with Messrs. Lafitte and Mauguin, a manufactory, in which the men were to share the benefits with the employers. In 1852 he became a member of the legislative assembly. Subsequently he became an ardent partisan of Bonapartism, pleading its cause as a journalist and poetically extolling the Napoleonic dynasty in many enthusiastic odes.

Belodon, an extinct reptile of the Triassic Period, partly intermediate between dinosaurs and crocodiles, but with many archaic characters. The body was protected by bony plates, those on the back interlocking by a peg-and-socket joint. The snout was long and narrow, the external nares behind in contrast to their position in modern crocodiles, where they are at the tip of the snout. The limbs were longer than those of modern crocodiles, but the proportions were otherwise similar. Its remains have been found in the Triassic coal-beds of North Carolina and Pennsylvania, and the red beds (estuarine sediments) of New Mexico, as well as in European strata of corresponding age.

Beloe, William, English clergyman and writer: b. 1756; d. 1817. He was educated at Cambridge, and was presented to the rectory of All-hallows, London Wall, and subsequently to stalls in Lincoln Cathedral and St. Paul's. In 1803 he became keeper of the printed books in the British Museum. His chief publications are, 'Anecdotes of Literature and Scarce Books' (6 vols. 1806-12); a translation of Herodotus with a commentary; and 'The Sexagenarian' (1817).

Beloit, Wis., a city in Rock County, on the Rock River, and the Chicago & N. W. and Chicago, M. & St. P. R.R.'s, 85 miles southwest of Milwaukee and 91 miles west of Chicago. The city derives fine power for manufacturing from the river; and has the second largest wood-working machinery plant in the world, beside manufactories of gas-engines, windmills, iron, paper-mill machinery, plows, paper, rye flour (the oldest mill of its kind in the country), and bicycles. The city is widely known as the seat of Beloit College (q.v.). It was first settled in 1836. Pop. (1900) 10,436.

Beloit College, a co-educational (non-sectarian) institution in Beloit, Wis.; organized in 1847 by the Congregational and Presbyterian Churches; reported at the end of 1899: Professors and instructors, 25; students, 412; volumes in the library, 24,500; grounds and buildings valued at \$335,000; productive funds, \$420,000; income, \$28,000; number of graduates, 605; president, Edward D. Eaton, LL.D.

Bel'omancy, divination by arrows, practised by the ancient Scythians and other nations. One of the numerous modes was as follows: A number of arrows, being marked, were put into a bag or quiver, and drawn out at random; and the marks or words on the arrow drawn determined what was to happen. See *Ezek.* xxi. 21.

Beloochistan. See BALUCHISTAN.

Belot, bē-lō, Adolphe, French novelist and dramatist: b. Pointe-a-Patre, 6 Nov. 1829; d. Paris, 17 Dec. 1890. He traveled extensively and settled at Nancy as a lawyer. He won reputation with a witty comedy, 'The Testament of César Girodot' (1859, with Villetard); and, being less successful with his following dramatic efforts, devoted himself to fiction. Of his novels may be mentioned: 'The Venus of Gordes' (1867, with Ernest Daudet); 'The Drama of the Rue de la Paix' (1868); 'Article 47' (1870); all of which were dramatized.

Belper, England, a market town of Derbyshire, on the left bank of the Derwent, over which there is a handsome stone bridge of three arches; seven miles north of Derby, on the Midland Railway. It has three churches, besides other places of worship, a public hall, with reading-rooms, library, etc. There are large cotton-mills, hosiery works, engineering works, and foundries. It is a thriving town and has been very much improved since about 1890. Pop. (1901) 10,920.

Bel'phegor. 1. An arch-demon appointed by Pluto and his council to undertake an earthly marriage, who fled unable to endure female companionship. He has been made the subject of one of La Fontaine's 'Contes,' and also of an English play by Wilson, published in 1691.

2. An English play by Charles Webb, translated and adapted from the French 'Paliasse,' in which the chief character is Belphegor, a mountebank.

3. One of the deities of the Moabites.

Belsham, Thomas, English Unitarian clergyman: b. 1750; d. 1829. He became theological tutor of an academy at Daventry in 1781. At this time he was a Calvinist, but a change of views unfitted him for this situation, and he became tutor of an academy which had been recently established at Hackney. This institution soon failed for want of funds, and Belsham removed first to the Gravel Pit Chapel, which had been occupied by Dr. Priestly, and afterward to Essex Street Chapel, where he officiated for some time as the colleague of Lindsey, and latterly as sole pastor till his death in 1829. His works are chiefly of a controversial nature, and probably attracted attention as much from the celebrity of the works which they attacked as from their own merits. His first appearance in the polemical field was as an opponent of Wilberforce, of whose celebrated 'Practical View of the Prevailing Religious Systems' he published a review. He also published 'Memoirs of Mr. Lindsey,' which was reviewed by the celebrated Robert Hall.

Belsham, William, English writer: d. 1827, aged 75. He published in 1789 'Historical, Political, and Literary Essays' (2 vols. 8vo.); and he subsequently wrote on the test law, the French Revolution, parliamentary reform, and other subjects; but his principal work is a 'History of Great Britain, from the Revolution to the Treaty of Amiens' (1793-1806), 12 vols. 8vo.).

Belshazz'ar, the last of the Chaldean dynasty who reigned at Babylon. He is supposed to have been the son of the Nabonnedus of Berosus, Labynetos of Herodotus, and Nabonde-lus of Josephus, and to have been adopted by

his father as joint king some time before the fall of Babylon. He perished 538 B.C. during the successful storming of Babylon by Cyrus. The interesting circumstances which immediately preceded this event, and are recorded at length in the book of Daniel, have repeatedly furnished subjects to painters and poets.

Belt, The Great and Little, two straits of Denmark, connecting the Baltic with the Cattegat. The former runs between the islands of Zealand and Funen, and is about 15 miles wide, where it is crossed from Nyborg, in Funen, to Corsoer, in Zealand. The greatest breadth of the strait is 20 miles. The navigation is very dangerous, on account of the many small islands and sandbanks by which the channel is impeded. The Little Belt is between the island of Funen and the coast of Jutland, and the narrowest part of the strait is not more than a mile wide. At this place stands the fortress Fredericia, where tolls were formerly paid. The fortress completely commands the entrance from the Cattegat. The Sound, between Zealand and the Swedish coast, is preferred for all large vessels entering or leaving the Baltic.

Belt, in astronomy, a varying number of dusky, belt-like bands or zones encircling the planet Jupiter parallel to his equator, as if the clouds of his atmosphere had been forced into a series of parallels through the rapidity of his rotation, and the dark body of the planet was seen through the comparatively clear spaces between.

Beltane. See BAAL.

Belton, Texas, a city and county-seat of Bell County, situated on the Leon River, northeast of Austin City, and on the Gulf C. & S. F., and the Missouri, K. & T. R.R.'s. Baylor Female College is located here. It is in a cotton-growing district, near some good building-stone quarries, and has a considerable export trade; its chief manufactures are cotton-mills, a cotton-seed oil-mill, flour-mills, and foundries. Pop. (1900) 3,700.

Beltraffio, bēl-trā'f'yō, or **Boltraffio**, Italian painter. b. Milan, 1467; d. 1516. He was a pupil of Leonardo da Vinci and imitated him in the treatment of his subject and in the use of color. Among his works are several portraits and a 'Madonna of the Casio Family.'

Beltrame, Giovanni, bēl-tra'mā, jō-vā'n'ē, Italian philologist and missionary. b. 11 Nov. 1824. In 1854 he was sent in a missionary party to Khartum up the Blue Nile to Fazogl; in 1858 he went with Knoblecher and other missionaries up the White Nile to Gondokoro, whence he made several journeys into a country at that time wholly unknown. He returned to Italy in 1862 and occupied himself principally with researches in the languages of the Nile country. Among other philological works he published a grammar and a dictionary of the Denka speech. He was author also of 'Di un Viaggio sul Fiume Bianco nell' Africa Centrale'; 'Il Sennaar e lo Sciangallah'; 'Il Fiume Bianco e i Denka,' and 'In Palestina.'

Beltrami, Eugenio, bēl-trā'mē, yoo-jā'n'yo, Italian mathematician: b. 16 Nov. 1835; d. 18 Feb. 1900. He studied at Pavia. In 1862 he was professor at Bologna, then professor at Pisa, Rome, and Pavia, and in 1891 again at

Rome. He was president of the Academy of the Lincei. His work has been chiefly in non-Euclidian geometry; also in electricity, and magnetism. His 'Mathematical Works' (1902), and 'Bibliography of Mathematics' (1901), were published by the University of Rome after his death.

Beltrami, Giovanni, jō-vā'n'ē, Italian lapidary: b. Cremona, 1779; d. 1854. He was self-educated and at the time of French rule in Italy found a patron in Eugene Beauharnais for whom he made a chain of 16 cameos, illustrating the story of Psyche. Among his other notable works is a reproduction of the 'Last Supper' of Leonardo da Vinci on a topaz.

Beluga, bē-loo'ga, an old name, adopted as the name of its genus, of the white whale (q.v.).

Beluga, or **Bielaga**, bē-lā'gā. See STURGEON.

Be'lus, the Roman name of the Assyrian and Babylonian divinity called Bel in Isaiah xlv. 1.

Belus, a Phœnician river at the base of Mount Carmel. Its fine sand, according to tradition, first led the Phœnicians to the invention of glass.

Belus, Temple of, an enormous temple in ancient Babylon, rebuilt by Nebuchadnezzar about 604 B.C. Its site is thought by some authorities to be the modern Bers-Nimrud, and by others, Babil, both situated near Hillah.

Belvedere, bēl-vē-dēr', or It. bāl-vā-dā'rē (It. "fine sight" See BELLEVUE). A name given in Italy to buildings destined for the enjoyment of prospects. The name is also given to small cupolas on houses built for the advantage of fresh air, or of the view which they afford. Many of the buildings in Rome are furnished with such cupolas; yet the term "belvedere" is generally applied only to those on the palaces of the rich. This is the name also of a part of the Vatican where the famous statue of Apollo is placed, which, on this account, is called Apollo Belvedere.

Belvidere, bēl-vī-dēr', Ill., a city and county-seat of Boone County; on the Kishwaukee River, and the Chicago & N. W. R.R.; 78 miles northwest of Chicago. An important farming and dairying trade centre, and contains railroad shops, one of the largest sewing-machine and bicycle works in the country, manufactory of sewing-machine supplies, flour-mills, creamery, and other industries; and has two national banks, several daily and weekly periodicals, and a property valuation of about \$2,000,000. Pop. (1900) 6,937.

Belzoni, Giovanni Battista, (JOHN BAPTIST), bēl-zō'nē, jō-van' nē ba-tēs'ta, Italian traveler: b. Padua, 1778; d. 3 Dec. 1823. Destined for a monastic life he was educated at Rome, but left the city when it was occupied by the French, and in 1803 went to England, where he acted in Astley's amphitheatre. Here he acquired, besides an acquaintance with the English language, much knowledge of the science of hydraulics, the study of which had been his chief occupation in Rome, and which afterward carried him to Egypt. He left England after a residence of nine years, and took his way through Portugal, Spain, and Malta, to Egypt. There he lived from 1815 to 1819, at first as a dancer, till he won the favor of the pasha.

Belzoni kept the rude inhabitants of the country in awe by his extraordinary stature and strength. He opened the second of the pyramids of Ghizeh, known by the name of Cephrenes. In the year 1816 he succeeded in transporting the bust of Memnon from Thebes to Alexandria, whence it was taken to the British Museum. In 1817 he entered several catacombs near Thebes, especially one in a fine state of preservation in the valley of Biban el Molook, which is considered to be the mausoleum of Psammetichus, and from which he took the splendid alabaster sarcophagus which is now in the British Museum. On 1 August in the same year he opened the temple of Ipsambul, near the second cataract of the Nile, which two Frenchmen, Cailliaud and Drovetti, had discovered the year before, but had not succeeded in opening. Belzoni discovered a subterranean temple in its ruins, which until that time had been unknown. He then visited the coasts of the Red Sea and the city of Berenice, discovering the emerald mines of Zubara and made an expedition into the Oasis of Jupiter Ammon. Belzoni refuted Cailliaud's assertion, that he had found the famous Berenice, the great emporium of Europe and India, by subsequent investigations on the spot, and by the actual discovery of the ruins of that great city four days' journey from the place which Cailliaud had taken for Berenice. Belzoni's 'Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, and Excavations in Egypt and Nubia; and of a Journey to the Coast of the Red Sea in Search of Berenice; also of another to the Oasis of Jupiter Ammon' (Lond. 1820); accompanied by a folio volume of 44 copper-plate engravings, was received with general approbation. Padua, his native city, requited his present of two Egyptian statues from Thebes with a medal by Manfredini. In the year 1823 this enterprising traveler had made preparations for passing from Benin to Houssa and Timbuctoo, when he died at Gato, on his way to Benin, 3 Dec. 1823. He believed the Nile and Niger to be different streams, and that the Niger emptied its waters into the Atlantic Ocean; opinions which have long been proved to be correct.

Belzu, Manuel Isodoro, mā'noo-el ē-sō-dō'rō, Bolivian revolutionist: b. LaPaz, 1808; d. March 1866. He led the revolutions of 1847 and 1848, and was killed in a street battle there while leading a revolt against Melgarijo.

Bem, Jozef, a distinguished military commander b. Tarnow, in Galicia, 1795; d. Aleppo, Syria, 1850. He was educated at the University of Cracow, and in 1810 was admitted into the corps of cadets founded at Warsaw by Napoleon, afterward entered the horse artillery, and took part as lieutenant in the expedition of the French army to Russia. For the bravery here displayed by him he received the decoration of the cross of the Legion of Honor. On hearing of the outbreak of the Polish revolution, he at once hurried to Warsaw, and during the whole of the Polish struggle he displayed great gallantry and military skill. On the night of 7 Sept. 1831, he held the bridge of Praga with his artillery, but the following morning, on hearing of the agreement concluded with the Russians, withdrew to Modlin. After the fall of Warsaw he went to Prussia, and in 1832 to Paris, where he was occupied partly with political schemes,

partly with scientific pursuits. Upon the commencement of the Austrian insurrection in 1848, Bem proceeded there, and took a prominent part in conducting the defense of Vienna against the imperial troops. Toward the end of the year he received a commission from the new Hungarian government to undertake the conquest of Transylvania, and crossed over into that territory at the head of a large army, raised by his own exertions in an incredibly short space of time. His progress here was marked by great successes, with occasional checks; and in March 1849 he succeeded in driving the Austrians, with their Russian auxiliaries, into Wallachia. He subsequently made an incursion into the Banat, which he compelled Puchner to evacuate. Returning to Transylvania, he found himself opposed by overwhelming numbers, and, after several reverses, returned to Hungary, where he took part in the disastrous battle of Temesvar. Shortly after he went to Turkey, became a convert to Mohammedanism, and received an appointment in the Sultan's army under the name of Amurath Pasha.

Bema (Gr. *bēma*, a stem), the name applied in the Greek Church to the sanctuary because of its position above the rest of the church. The iconostasis or choir screen divides it from the main portion of the church.

Bembato'ka, Bay of, a safe and commodious bay on the northwest coast of Madagascar, lying in lat. 16° S. and lon. 46° E. The river Betsiboka, with the Ikiopa, drain into the bay; the former, about 300 miles long, is navigable for small steamers for about 90 miles. Mojanga, on the north side of the bay, is the second town in the island, with about 14,000 inhabitants, Bembatoka being but a village.

Bemberg, bän-bär, Henri, French composer: b. Paris, 1861. Besides songs and piano-forte numbers his principal works are 'Le Baiser de Luzon,' a one-act opera (1888); and 'Elaine,' a four-act opera successfully produced in London 1892, and in New York 1894.

Bembecidae, bēm-bis'i-de, a family of wasp-like hymenopterous insects with stings, mostly natives of warm countries, and known also as sand-wasps. The female excavates cells in the sand, in which she deposits, together with her eggs, various larvæ or perfect insects stung into insensibility, as support for her progeny when hatched. The insects are very active, fond of the nectar of flowers, and delight in sunshine. *Bembex* is the typical genus of the family.

Bembo, Pietro, a celebrated Italian scholar: b. Venice, 29 May 1470; d. 18 Jan. 1547. At Ferrara he completed his philosophical studies, and after visiting Rome went, in 1506, to the court of Urbino, at that time one of those Italian courts where the sciences stood highest in esteem. In 1512 he went to Rome, where Pope Leo X. made him his secretary. His many labors arising from his office, as well as his literary pursuits, and perhaps too great an indulgence in pleasure, having impaired his health, he was using the baths of Padua when he was apprised of the death of Leo X. Being by this time possessed of several church benefices, he resolved on withdrawing entirely from business, and on passing his days at Padua occupied only with literature and science, and enjoying the society of his friends. Bembo

BEMBRIDGE BEDS — BEN-MUICH-DHUI

collected a considerable library: had a cabinet of medals and antiquities, which at that time passed for one of the richest in Italy, and a fine botanical garden. In the year 1529 the office of historiographer of the republic of Venice was offered to him, which he accepted, declining the salary connected with it. At the same time he was nominated librarian of the library of St. Mark. Pope Paul III., having resolved upon a new promotion of cardinals, from the most distinguished men of his time, conferred on him, in 1539, the hat of a cardinal. From that time Bembo renounced the belles-lettres, and made the Fathers and the Holy Scriptures his chief study. Of his former labors he continued only the 'History of Venice.' Two years later Paul III. bestowed the bishopric of Gubbio on him, and soon after the rich bishopric of Bergamo. A collection of all his works appeared in 1729, at Venice, in four folio volumes.

Bembridge Beds, in geology, a fossiliferous division of the upper Eocene strata, principally developed at Bembridge, in the Isle of Wight, consisting of marls and clays resting on a compact, pale-yellow or cream-colored limestone, called Bembridge limestone. Their most distinctive feature is the mammalian remains of the Palæotherium and the Anoplotherium. The Anita group of Colorado and Wyoming, and the gypsum deposits near Paris, are supposed to belong to the same epoch as the Bembridge beds.

Bementite, a mineral occurring at Franklin Furnace, New Jersey, in radiated-stellate masses. It has a grayish-yellow color and pearly lustre, is soft and has a specific gravity of about 3.0. It is a hydrous silicate of manganese, having the approximate formula of $2\text{MnSiO}_3 \cdot \text{H}_2\text{O}$. It was named in honor of C. S. Bement, whose unrivaled private collection of minerals is now in the American Museum of Natural History in New York city.

Bemis, Edward Webster, American economist: b. Springfield, Mass., 7 April 1860. He graduated at Amherst College in 1880; was a pioneer lecturer in the University Extension System, 1887-8; professor of economics and history, Vanderbilt University, 1889-92; and associate professor of economics, University of Chicago, 1892-5. In 1897 he became professor of economical science in the Kansas State Agricultural College. He published 'History of Co-operation in the United States' (1888); 'Municipal Ownership of Gas' (1891); 'Local Government for the South and Southwest' (1893).

Bemis Heights, N. Y., a village in Saratoga County, on the Hudson River, famous as the scene of the first battle of Stillwater, 19 Sept. 1777. See also SARATOGA, BATTLE OF.

Bemmel, Peter von, German painter: b. Nuremberg, 1685; d. 1754. He was educated by his father, also an artist, and was employed by the Prince Bamberg, Franz Konrad von Stadion in adorning the walls of his palaces. Many of his paintings are preserved at Bamberg and Brunswick. Of the Bemmel family 14 were prominent as artists.

Ben (Hebrew, son), a prepositive syllable found in many Jewish names, as Bendavid, Benasser, etc., which, with the Jews in Germany, has been changed into the German *sohn* (son),

for example, Mendelssohn, Jacobssohn, etc. In Arabic the plural form *Beni* occurs in the names of many tribes, as *Beni Omayyah* and in those of places, as *Beni-Hassan*.

Ben, Beinn, or Bhein, a Gaelic word signifying mountain, and prefixed to the names of many mountains in Scotland north of the Firths of Clyde and Forth, as *Ben Nevis* and *Ben MacDhui*. *Pen*, which occurs in Welsh and Cornish nomenclature is a corresponding term.

Ben Bolt, a noted poem by Thomas Dunn English (1843) set to an old German air. It had been partially forgotten when it was revived by its effective employment in Du Maurier's 'Trilby.'

Ben Hur: A Tale of the Christ, a popular novel, by Lew Wallace, published 1880. The scene of the story is laid in the East, principally in Jerusalem, just after the Christian era. The first part is introductory, and details the coming of the three wise men, Melchior, Kaspar, and Balthasar, to worship the babe born in the manger at Bethlehem. In the course of the narrative, which involves many exciting adventures of Ben Hur, hero, John the Baptist and Jesus of Nazareth are introduced, and Ben Hur is converted to the Christian faith through the miracles of our Lord. The tale has been successfully dramatized.

Ben-Lawers, a huge pyramidal mountain of Scotland, Perthshire, on the north bank of Loch Tay, 3,984 feet above the level of the sea, or 4,004 with the cairn at the top. Many rare Alpine mosses and other plants are found on it.

Ben-Ledi, a Scottish mountain, lying northwest of Callander, Perthshire, reaching the height of 2,875 feet above sea-level. It is somewhat difficult of ascent, but gives a splendid view. High up on it there is a small loch. It is mentioned in Scott's 'Lady of the Lake.'

Ben-Lomond, a Scottish mountain at the western extremity of Stirlingshire, on the east shore of Loch Lomond. The ascent is divided into three great stages, and the top has an elevation of 3,192 feet above sea-level. On the southeastern side it presents a sheer precipice of about 2,000 feet. From the hotel at Rowardennan, on the east shore of the loch, to the summit, the distance is four miles. The lower part is well wooded, and the upper affords excellent healthy pasture. It commands a most extensive prospect of the vale of Stirlingshire, the Lothians, the Clyde, Ayrshire, Isle of Man, Hills of Antrim, and all the surrounding highland territory. Like Ben-Lawers this is one of the botanical gardens of the highlands.

Ben-More (the great mountain), a conical hill between Loch Dochart and Loch Voil, western part of Perthshire, among the Braes of Balquhider. It rises to an elevation of 3,843 feet above the level of the sea. Several other hills also bear this name.

Ben-Muich-Dhui, bēn-māk-doo'e, or **Ben-Mac-Dhui**, the second highest mountain in Scotland, situated in the southwest corner of Aberdeenshire, on the borders of Banffshire. It is a granitic mass, rising to the height of 4,296 feet, and forms one of a cluster of lofty mountains, among which are Brae-riach, Cairntoul, Cairngorm, Ben-a-bourd, and Ben-A'an. Its upper parts are bare of vegetation. The view from the top includes the Moray Firth, the

BEN NEVIS—BENBOW

hills of Caithness and Sutherland, Ben Nevis, Benmore, etc.

Ben Nevis, a Scottish mountain now ascertained to be the most lofty height in Great Britain, is situated in the southwestern extremity of Inverness-shire, immediately east of Fort William and the opening of the Caledonian Canal into Loch Eil. It rises from the brink of the latter piece of water to the height of 4,406 feet. In clear weather a view can be obtained from its summit across nearly the whole of the north of Scotland from sea to sea. It consists principally of a fine brown porphyry, and contains red granite of a beautiful grain. It has some very lofty precipices, and in its fissures the snow remains unmelted, even in the warmest weather. An observatory occupied by a resident staff was established on the top of the mountain by the Scottish Meteorological Society in 1883.

Ben Nut. See **BEN, OIL OF.**

Ben, Oil of, the expressed oil of the ben-nut, the seed of *Moringa aptera*, the ben or horse-radish tree of India. The oil is inodorous, does not become rancid for many years, and is used by perfumers and watchmakers.

Benaiah, bē-nā'ya, the name of 12 different persons mentioned in the Bible, the most important being a son of Jehoida, a chief priest. He figures as a mighty and valiant warrior who overcame two Moabite champions, slew an Egyptian giant with the giant's own spear, went down into a dry cistern and slew a lion that had fallen in while it was covered with snow, and killed the rebels Adonijah and Joab. He was made commander-in-chief in Joab's place by Solomon.

Benalcazar, bā-nał-ka'thār, **Sebastian de**, Spanish leader, the first conqueror of Popayan, New Granada: b. about the end of the 15th century, at Benalcázar, in Estremadura, Spain; d. 1550. He set out as a common sailor in the train of Pedrarias, the newly appointed governor of Darien, 1514. The ability and daring of young Sebastian gained for him the confidence of Pizarro, who sent him against the Indian leader, Ruminahui. Sebastian was favored at the moment of engagement by a happy accident; the volcano of Cochabamba suffered an eruption. The frightened Peruvian army fled to Quito and Sebastian then possessed himself of the smoking ruins of this city. From here he passed northward and conquered the territory possessed by a chief named Popayan, whose name he preserved to designate the territory over which the former had held sway. Inflamed by the speeches of an Indian captive, who spake strange words about a chief farther north, anointed with gold powder, Benalcazar and his band determined to visit and conquer this *El Dorado*, or chief of gold. After traversing vast forests, in 1534, he arrived at the country which afterward received the name of New Granada. Arrived there, he found himself forestalled by two other Spanish adventurers, or conquistadores. He returned to Popayan, and was made governor of this province by a decree dated 1538. When La Gasca succeeded in supplanting Diego Pizarro, he deprived Sebastian of his governorship.

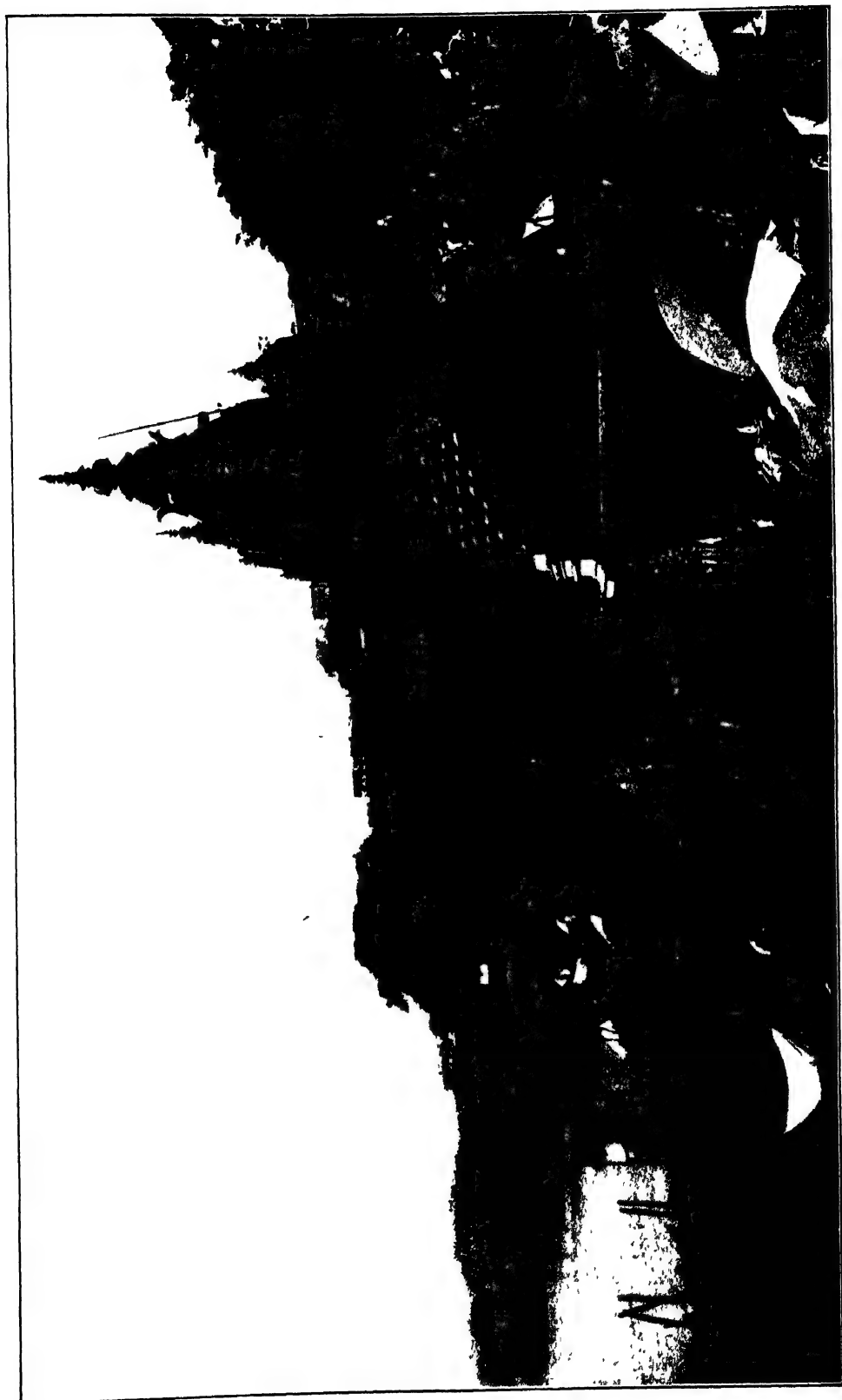
Benares, bē-nā'rēz, a division in the north-western provinces of India, with an area of 10,414 square miles, largely made up of rich cultivated flats on each side of the Ganges.

The heat in summer is excessive, but in winter fires are requisite. Garden stuffs, grain of different kinds, flax for oil, and sugar, are the principal objects of cultivation. Rice, for which many parts of the soil seem well adapted, is seldom grown. Muslins, silks, and gauzes, salt, indigo, and opium, are made very extensively. The principal town is Benares. Pop. (1901) 5,368,600, and the Hindus greatly outnumbering the Mussulmans.

Benares (in Sanskrit, *Vārāṇasī*), a town in Hindustan, northwest provinces, in the division of the same name, on the left bank of the Ganges, from which it rises like an amphitheatre, presenting a splendid panorama of temples, mosques, palaces, and other buildings, with their domes, minarets, etc. Fine ghauts lead down to the river. It is built of freestone, and contains many handsome and highly decorated houses, but the height of the houses and narrowness of the streets give it all the usual inconveniences of an Asiatic town. Kasi, the Splendid, as the Hindus commonly call it, is one of the most sacred places of pilgrimage in all India, being the headquarters of the Hindu religion. To die at Benares is the greatest happiness for a Hindu, because he is then sure of immediate admission into heaven. The number of pious foundations and temples is exceedingly great. There is a continual influx of wealthy pilgrims into the city, and many of the Hindu princes have a town residence here. The principal temple, called Bisheswar, is dedicated to Siva. Aurungzebe built a splendid mosque on the highest ground in the city, and it is the most prominent object from the river side. At the end of the 17th century an observatory was erected in this city by one of the rajahs, which still exists. One of the temples has a great number of sacred monkeys attached to it. Altogether there are about 1,500 Hindu temples. Among the municipal structures are the government college, hospitals, town-hall, asylums, swimming baths, and waterworks. Benares carries on a large trade in the produce of the district and in English goods, and manufactures silks, shawls, embroidered cloth, jewelry, etc. The merchants and bankers are numerous and wealthy. There are few English inhabitants, except the government officers, and the members of the various missions. Kasi was ceded to the East India Company by the Nabob of Oude in 1775. During the mutiny of 1857 a serious outbreak occurred here. Pop. (1901) 203,100. See Sherring, 'Sacred City of the Hindus' (1869).

Benaventé, bā-na-vén'tā, a town of Spain, in the province of Zamora, on the western bank of the Esla, 34 miles north from Zamora. It is overlooked by a huge, half-ruined castle, and is now a dull and poverty-stricken place, built chiefly of mud cottages. It was here that Moore's retreat commenced, 28 Dec. 1808.

Benbow, John, famous English admiral: b. Shrewsbury, England, 1653; d. Jamaica, 4 Nov. 1702. After serving for some time in the navy he entered the merchant service, and fought so desperately against a pirate from Salée, in one of his trips to the Mediterranean, about the year 1686, as to beat her off, though greatly his superior in men and metal. He re-entered the navy after the Revolution, and was employed in protecting the English trade in the channel, which he did with great effect. His valor and



BENARES, INDIA.

BENCH — BENDALOU

activity secured him the confidence of the nation, and he was soon promoted to the rank of rear-admiral, and charged with operations against Dunkirk and the French coasts. In 1698 he was sent to put down the pirates in the West Indies, and not long after returning, he again sailed to the West Indies with a small fleet, having accepted a command previously declined by several of his seniors, from the supposed superiority of the enemy's force in that quarter. In August 1702, he fell in with the French fleet under Du Casse, and for five days maintained a running fight with them, when he at length succeeded in bringing the enemy's sternmost ship to close quarters. In the heat of the action a chain-shot carried away one of his legs, and he was taken below; but the moment the dressing had been applied to the wound he caused himself to be brought again on deck, and continued the action. At this critical instant, being most disgracefully abandoned by several of the captains under his command, who signed a paper expressing their opinion that "nothing more was to be done," the whole fleet effected its escape. Benbow, on his return to Jamaica, brought the delinquents to a court-martial, by which two of them were convicted of cowardice and disobedience of orders, and condemned to be shot; which sentence, on their arrival in England, was carried into execution at Plymouth.

Bench, in law, the seat which judges or magistrates occupy officially in a court of justice, also the judges or magistrates sitting together to try cases. The court of common pleas in England was formerly called *Bancus*, the Bench, as distinguished from *Bancus Regis*, the King's Bench. It was also called *Communis Bancus*, the Common Bench, and this title is still retained by the reporters of the decisions in the court of common pleas. Mention is made in the Magna Charta "*de justiciariis nostris de Banco*," which all men know to be the justices of the court of common pleas, commonly called the Common Bench, or the Bench. Viner, Abr. Courts (n. 2).

Bench-mark, a mark placed upon some permanent object, as a stone or wall, for use in tidal observations and leveling surveys. Its position above the zero of the tide-gauge or other datum level is made a matter of record and any level once established may be readily ascertained at a future period. See also LEVELING.

Bench Warrant, a warrant issued by the court before which an indictment has been found to arrest the accused, that he may appear and find bail for his appearance at the trial. Where a bench warrant is directed to the sheriff it cannot be executed by one having only verbal authority from the sheriff, and such arrest does not discharge the recognizance. A bench warrant is defective which does not direct that the party shall be brought before some judge or justice.

Benchers, in England, senior members of the Inns of Court, who have the entire management of their respective inns, the power of punishing barristers guilty of misconduct, and the right to admit or reject candidates to the bar. See also INNS OF COURT.

Bencoolen, bĕn-koo'lēn (Dutch, *Benkoelen*), a seaport of Sumatra, on the southwest coast; lon. 102° 19' E.; lat. 3° 47' 36" S. The English settled here in 1685, and in 1690 the East India Company built a fort here, calling it Fort York. In 1825 Bencoolen was yielded up to the Dutch in exchange for the settlements on the Malay Peninsula. A convenient river on its northwest side conveys pepper out of the inland country; but there is great inconvenience in shipping it, by reason of a dangerous bar at the river's mouth. The place, which is almost two miles in compass, is known at sea by a high, slender mountain, which rises in the country 20 miles beyond it, called the Sugar Loaf. It is inhabited by a mixed population. The medium heat throughout the year is from 81° to 82°. Pepper is the chief produce of the adjacent country, which is mountainous and woody. The place is unhealthy and subject to earthquakes; storms are frequent. Pop. 6,000.

Benczur, bĕn'tsoor, **Gyula (Julius)**, Hungarian artist. b. Nyiregyhaza, 1844. He was made professor at the Academy of Munich in 1880 and was subsequently director of the Academy of Budapest. His paintings, which are of the School of Piloty, are noted for their splendid coloring. Among the most celebrated are 'Farewell of Ladislav Hunyady' (1867); 'Arrest of Rákóczy' (1701); 'Louis XV in the Boudoir of Dubarry'; 'Family of Louis XVI. during the Assault on Versailles' (1872), owned by D. O. Mills, New York; 'Baptism of St. Stephen' (1875); 'Bacchanti' (1881); 'The Reconquest of Buda by Charles of Lorraine' (1888).

Bend, in heraldry, one of the nine honorable ordinaries, containing a third part of the field when charged, and a fifth when plain, made by two lines drawn diagonally across the shield from the dexter chief to the sinister base point. The bend sinister differs only by crossing in the opposite direction, diagonally from the sinister chief to the dexter base. It indicates illegitimacy.

Ben'da, Franz, German violinist. b. Jungbunzlau, Bohemia, 1709; d. Potsdam, 1786. He exhibited, while a boy, a great desire to learn the violin, which he could gratify in no other way than by joining a band of strolling musicians. He found means, however, to acquire an extraordinary mastery of the instrument, and in 1732 entered the service of Frederick the Great, then prince-royal, with whom he remained the rest of his long life. He founded a school of violinists, whose method of playing was entirely original and quite effective. He also published some excellent solos for the violin.

Benda, Georg, German musician, the most distinguished of a notable musical family: b. Jungbunzlau, Bohemia, 1721; d. Kostritz, 1795. He was bandmaster to the Duke of Gotha (1748-87), and in this period produced several operas and cantatas, such as 'Ariadne auf Naxos' and 'Medea.'

Bendalou, Paul, a soldier of the American Revolutionary army: b. Montauban, France, 15 Aug. 1755; d. Baltimore, Maryland, 10 Dec. 1826. In October 1776 he embarked at Bordeaux for the United States, as a volunteer in the cause of liberty, and, on reaching the headquarters of Washington, received a lieutenant's commission. Transferred to the command of

Pulaski, he was captain of the first company in his famous legion at the siege of Savannah. There he carried off the field the body of the generous Pole, and preserved, also, the standard of the legion, which had been wrought and presented by the wives and daughters of Maryland. He was quartermaster-general, with the rank of colonel, in the Maryland militia during the War of 1812, and for many years United States marshal for the circuit and district courts of Maryland, his official conduct, from first to last, being marked with exactness and integrity.

Bendemann, bën'dē-man, **Eduard**, German painter: b. Berlin, 3 Dec. 1811; d. Dusseldorf. 27 Dec. 1889. As early as 1832 his great picture of the 'Captive Jews' was exhibited at Berlin, and in 1837 he gained the gold medal at Paris. In 1838 he was appointed professor of the Academy of Art at Dresden. Here he was intrusted with the execution of the larger frescoes in the palace, and on these his fame chiefly depends. In 1858 he succeeded his father-in-law as director of the Dusseldorf Academy, a post which he held until 1867. He afterward produced several large canvases and frescoes, some of which are among his best works. Tytler, 'Modern Painters and their Paintings' (1899).

Bender, **Louis Prosper**, Canadian-American physician and author: b. Quebec, 30 July 1844. He graduated at McGill University in 1865, after having interrupted his studies by a service in the medical department of the Union army during a portion of the American Civil War. In 1884 he settled in Boston, Mass., where he established himself in homœopathic practice. His writings include 'Literary Sheaves,' or 'La Litterature au Canada-Français' (1881); 'Old and New Canada, 1753-1844,' 'Historic Scenes and Social Pictures, or the Life of Joseph François Perrault' (1882), etc. He has frequently contributed to American magazines.

Bender, a city of Russia, in the government of Bessarabia. It is situated on the Dniester, and is a straggling place, chiefly consisting of low houses and mere huts. It formerly possessed a strong fortress, but this was dismantled in 1897. Its commerce is important. After being several times taken from the Turks by the Russians, it has belonged to Russia since the Peace of Bucharest, in 1812. Pop. (1897) 32,934.

Bendigo, formerly **SANDHURST**, Australia, a city in Bendigo County, Victoria, on Bendigo Creek, fully 100 miles north-northwest of Melbourne, with which it has direct railway communication. It is one of the chief cities in the colony and an important railway centre. Along one side of its main street (Pall Mall) there are fine buildings of brick and stone, and facing these, in Rosalind Park, are the elegant government buildings and the law courts, which together cost nearly £80,000. Other buildings worthy of mention are the handsome town-hall, mechanics' institute, with library and school of mines; free library; temperance, masonic, and other halls; hospital, benevolent asylum; some fine banks; Anglican, Wesleyan, Presbyterian, and other churches; Roman Catholic Cathedral, in course of erection; art gallery, jail, state and other schools, etc. The public parks comprise, besides the Rosalind Park, the fine Botanic Gardens and two others largely used for sports. The streets are lighted by gas and electricity,

and there is an excellent water-supply from large reservoirs near the town. The chief industry of the district is gold-mining, which gives employment to 5,000 miners. Other important industries are brewing, iron-founding, stone-cutting, granite-polishing, tanning, and the manufacture of pottery, bricks, tiles, cordials, etc. Agriculture and viti-culture are carried on in the district, and there is a trade in wine and fruits. Bendigo was founded at the time of the gold discovery in 1851. Nearly £70,000,000 worth of gold has been obtained here, much of it from quartz reefs. Pop. (1901) 31,020. See Mackay, 'History of Bendigo' (1901).

Bendire, bën-dē're, **Charles Emil**, German-American military officer and ornithologist. b. Darmstadt, Germany, 27 April 1836; d. 1897. He came to the United States in 1852, and entering the army in 1854, served through the Civil War, becoming a captain in the 1st Cavalry. After the war he was transferred to the West, and was retired 24 April 1886. During his stay in the West he applied himself to the study of ornithology, and collected a vast amount of material in various branches of natural history. In 1870 he began to collect the eggs of North American birds, which finally numbered more than 8,000 specimens, and this collection he presented to the United States National Museum. He is the author of 'The Life Histories of North American Birds, with Special Reference to their Breeding Habits and Eggs.'

Bendzin, bënd'zen, the capital of a district in Russian Poland, in the government of Piotrkow, situated on the Black Przemsza, on a branch of the Warsaw & Vienna R.R. Its chief industry is the zinc works, under government control; there are also coal mines in the vicinity. Pop. 21,200.

Bene, bën'e, the plant that furnishes oil of sesamum. See **SESAMUM**.

Ben'edek, **Ludwig von**, Austrian military officer: b. Odenburg, Hungary, 14 July 1804; d. Gratz, 27 April 1881. He fought against the Italians in 1848, and afterward against the Hungarian patriots. He distinguished himself at Solferino in the campaign of 1859; and in the war with Prussia in 1866 commanded the Austrian army till after his defeat at Sadowa, when he was superseded.

Benedetti, bā-nē-dēt'te, **Vincent** (**COUNT DE**), French diplomatist of Italian extraction: b. Bastia, Corsica, 29 April 1817; d. Paris, 28 March 1900. He was educated for public service, held consulates in Cairo, Palermo, Malta, and Tunis; and as secretary of the Congress of Paris in 1856, drew up the protocols of the treaty then agreed upon. In 1861 he was appointed ambassador to Italy, and in 1864 to Prussia. In 1870 great excitement was aroused throughout Europe by the publication in the London *Times* of the alleged draft of a secret treaty between France and Prussia. The authenticity of the document was not denied. The French government declared that although Benedetti had written the document, he had done so at the dictation of Bismarck. At the same time Benedetti was under orders to protest against the candidature of Prince Leopold of the house of Hohenzollern for the crown of Spain. He became so importunate in trying to carry out these orders that he was forbidden to seek further interviews with King William. The refusal of

BENEDETTO — BENEDICT

the king to again receive Benedetti gave great offense in France, and was made a pretext for declaring war within a few days. After the fall of the empire, Benedetti withdrew from public life. In 1871 he published a pamphlet charging Bismarck with the whole responsibility of the secret treaty, to which the latter made a vigorous reply. Benedetti was author of 'Ma Mission en Prusse' (1871); and 'Studies in Diplomacy,' an English translation of which appeared in 1895.

Benedetto, bā-nā-dēt'tō, da Majano, Italian architect and sculptor: b. Florence in 1442; d. there, 1498. He began his career as a worker in wooden mosaic, and with his brothers, Giovanni and Giuliana, he executed the 'Madonna dell Ulivo.' His own work, represented in the 'Madonna,' far excels the work of his brothers. His most celebrated work as an architect was the Palazzo Strozzi, began in 1489. In 1490, he carved the busts of Giotto and Squarcilupo, in the Duomo at Florence. In 1491, the monument to Filippo Strozzi was erected in Santa Maria Novella, a work which Strozzi had commissioned Benedetto to make before his death. It is the *chef-d'œuvre* of the sculptor, and one of the most notable sculptures of the 15th century.

Benedicite, bēn-e-dis'ī-te, the song of the 'Three Children' in the fiery furnace, as given in the Apocrypha and the Septuagint version of Daniel, which is a part of the Roman Breviary in the office of lauds; it is also a part of the Anglican morning prayer, to be used when the Te Deum is not sung, usually from Septuagesima to Easter and during Advent.

Benedick, sometimes spelled **Benedict**, a married man; from the Latin *benedictus* (a happy man), and a skit on the order of St. Benedict, famous for their ascetic habits, and, of course, rigidly bound to celibacy. Shakespeare, in 'Much Ado About Nothing,' avails himself of this joke in making Benedick, the young lord of Padua, "rail against marriage," but afterward marry Beatrice, with whom he falls in love.

Benedict, Saint, the founder of the first religious order in the West: b. Norcia, Italy, 480, d. 21 March 543. In the 14th year of his age he retired to a cavern situated in the desert of Subiaco, 40 miles from Rome, and in 515 drew up a rule for his monks, which was first introduced into the monastery on Monte Cassino, in the neighborhood of Naples, founded by him (529) in a grove of Apollo after the temple had been demolished. This gradually became the rule of all the western monks. The abbots of Monte Cassino afterward acquired episcopal jurisdiction, and a certain patriarchal authority over the whole order. Benedict, with the intention of banishing idleness, prescribed, in addition to the work of God (as he called prayer and the reading of religious writings), the instruction of youth in reading, writing, and ciphering, in the doctrines of Christianity, in manual labors (including mechanic arts of every kind), and in the management of the monastery. With regard to dress and food, the rule was severe but not extravagant. Benedict caused a library to be founded, for which the aged and infirm brethren (*ordo scriptorius*) were obliged to copy manuscripts. By this means he contributed to preserve the literary remains of antiquity from

ruin; for though he had in view only the copying of religious writings, yet the practice was afterward extended to classical works of every kind; and the learned world is indebted for the preservation of great literary treasures to the order of St. Benedict.

Bibliography.—Wolffr., 'B. von Nursia und seine Monchsregel' (1895); Henderson, 'Historical Documents of the Middle Ages,' pp. 274-314 (1892); 'Die historische Voraussetzungen der Regel des heiligen Benedict von Nursia' (1895); Doyle, 'Teachings of Saint Benedict' (1887). See BENEDICTINES.

Benedict, the name of fourteen Popes.

Benedict I., succeeded John III. 575; d. 578, and was himself succeeded by Pelagius II.

Benedict II., succeeded Leo II. 684; d. 685, and was succeeded by John V.

Benedict III., succeeded Leo IV. 855. During his pontificate, the Saracens were ravaging Apulia and Campania. D. 858, and was succeeded by Nicholas I.

Benedict IV., succeeded John IX. about 900. He crowned Louis, son of Boson, emperor and king of Italy. D. 903, and was succeeded by Leo V.

Benedict V., succeeded John XII. 964, and was appointed by the Romans in opposition to Leo VIII. The Emperor Otho, supporter of Leo, appeared before Rome with an army, reduced the city to famine, and a new assembly of the clergy declared to be null the election of Benedict, who was exiled. D. 965.

Benedict VI., succeeded John XIII. 972. After the death of the Emperor Otho I., the Romans imprisoned Benedict, who was strangled in the castle of St. Angelo, in 974. We know nothing of Donus II., mentioned as the next Pope, except that he died after a few months, and was succeeded by

Benedict VII., of the family of Conti, elected in 975. During his pontificate, the Emperor Otho II. came repeatedly to Rome, where he died in 984. Benedict died about the same time, and was succeeded by John XIV.

Benedict VIII., of the same family, succeeded Sergius IV., in 1012. In 1016, the Saracens from Sardinia having landed on the coast of Tuscany, Benedict attacked and defeated them. He crowned the Emperor Henry II., and his wife, in the Church of St. Peter. D. 1024, and was succeeded by his brother, John XIX.

Benedict IX., a relative of the two preceding Popes, succeeded John XIX. in 1034. He was then very young, some say only 18 years old. He was distinguished by his licentiousness and profligacy, and by the state of anarchy in which Rome was plunged during his pontificate. He was deposed in 1048, and died in a convent in 1054, being succeeded by Leo IX.

Benedict X. was elected by a faction after the death of Stephen IX., in 1058; but the Council of Siena nominated Nicholas II. Benedict did not submit till the following year, when Nicholas made his entrance into Rome. D. 1059.

Benedict XI., a Dominican, succeeded Boniface VIII., in 1303. Contemporary historians speak highly of his character and virtues. He died 1304, and was succeeded by Clement V.

BENEDICT — BENEDICT BISCOP

Benedict XII., Jacques Fournier, a native of France, succeeded John XXII., in 1334, the Popes residing then at Avignon. He put a stop to many abuses in the distribution of ecclesiastical patronage, enforced discipline among the monastic orders, and insisted that temporal rulers should observe their compacts with the Holy See. D. 1342, and was succeeded by Clement VI.

Benedict XIII., Cardinal Orsini, succeeded Innocent XIII., in 1724, but it was with difficulty that he could be made to accept the pontificate. Benedict lived with the greatest frugality, and has been called more a monk than a Pope. He managed, however, to transact an extraordinary number of affairs. His great fault was his implicit confidence in Cardinal Coscia, who much abused it. D. February 1731. His works were published in 1728, in three volumes folio. He was succeeded by Clement XII.

Benedict XIV., Prospero Lambertini: b. Bologna, 1675; d. 3 May 1758. He applied himself with success to the canon and civil law, and became advocate to the consistory at Rome. Afterward he was appointed *promotor fidei*, and wrote a valuable work on the 'Ceremonies used in Beatifications' (1734). He was passionately fond of learning, of historical researches, and monuments of art, and also associated with the distinguished men of his time; among others with Father Montfaucon, who said of him, "Benedict has two souls; one for science and the other for society." He also made himself familiar with the best poetical works, whereby his mind became elevated and his style animated. Benedict XIII made him, in 1727, bishop of Ancona; in 1728 cardinal, and in 1732 archbishop of Bologna. In every station he displayed great talents, and fulfilled his duties with the most conscientious zeal. He opposed fanaticism even at the risk of his own safety, defended the oppressed, and expressed himself with the greatest frankness to Clement XII. without losing his favor. When, after the death of Clement XII. in 1740, the election of a new Pope in the conclave was retarded by the intrigues of Cardinal Tencin, and the cardinals could not agree, Lambertini, with his usual good nature, said to them, "If you want a saint, take Gotti; if a politician, Aldobrandi; if a good old man, myself." These words, thrown out in a humorous manner, operated on the conclave like inspiration, and Lambertini, under the name of Benedict XIV., ascended the papal throne. His choice of the ministers and friends whom he assembled around him does the greatest honor to his judgment. The condition of the Church and of the Roman court had not escaped his penetration. Since the Reformation princes no longer trembled at the thunders of the Vatican. The power of the Popes in temporal affairs had notably declined, and Lambertini knew that respect for the papal authority could be maintained only by a wise moderation. He constantly regulated his measures by this principle, and thus succeeded, even in difficult circumstances, in satisfying not only the Catholic but even the Protestant princes. The sciences were a special object of his care. He established academies at Rome; promoted the prosperity of the academy at Bologna; caused a degree of the meridian to be measured; the obelisk to be erected in the Campus Martius; the

Church of St. Marcellino to be built after a plan projected by himself; the beautiful pictures in St. Peter's to be executed in mosaic; the best English and French works to be translated into Italian; and commanded a catalogue of the manuscripts contained in the Vatican library (the number of which he had enlarged to 3,300) to be printed. His government of the papal states did equal honor to his wisdom. He enacted severe laws against usury, favored commercial liberty, and diminished the number of holidays. His piety was sincere, yet enlightened and forbearing. He strove to maintain purity of doctrine and of morals, giving in his own character the most praiseworthy example. The sole reproach brought against him by the Romans was that he wrote too much and governed too little. His works compose, in the Venice edition, 16 volumes folio. The most important of his works is that on the Synods, in which we recognize the great canonist.

Benedict Biscop, Anglo-Saxon ecclesiastic: b. of a noble Northumbrian family in 628 or 629; d. Wearmouth, 12 Jan. 690. He spent the first years of his life at court, but at the age of 25 he relinquished this manner of life and accompanied Wilfrid on a pilgrimage to Rome in 653. Here he lived for more than 10 years, when he returned to England; but not very long after again went to Rome, on a mission intrusted to him by Alchfrid, king of Northumbria. On his way back he stopped at Lerins in Provence, where he remained for the next two years, making himself acquainted with the rules of monastic life in the monastery of Lerins, of which he had become a member. In 668 he made a third journey to Rome, where he arrived just at the time when the Pope was about to appoint some one to fill the see of Canterbury, which was then vacant. Having fixed upon Theodore, a Cilician monk, he requested Benedict to accompany him to England to assist him in securing the favor of the Anglo-Saxons, which as a foreigner he might have difficulty in doing. Benedict agreed to do this, and was presented with the abbacy of St. Peter's in Canterbury; but at the end of two years he resigned the abbacy and again went to Rome. On this occasion he returned to England with a valuable collection of books and a large number of relics, which he had accumulated during his previous visits to Rome. With these he proceeded first to Wessex with the intention of remaining there, but finding that the king of Wessex was dead he turned northward to his native Northumbria, and there he was fortunate enough to secure the favor of King Egfrid. From him he received a donation of land at the mouth of the Wear, on which he founded the monastery of Wearmouth. In 678 he made his fourth journey to Rome, and brought back additional stores of books for his library, as well as pictures, images, glass for windows, etc., with which he decorated the monastery he had founded. He was now presented by Egfrid with a further grant of land on the other side of the Wear, where he founded another monastery, that of Jarrow, dependent on the monastery at Wearmouth. During the remainder of his life he continued to live in the latter monastery, except on the occasion of a fifth voyage to Rome, made in 685, and from which he derived as before valuable additions to his various collections. It is chiefly by these collections that his services to learning are to be

BENEDICT — BENEDICTINES

estimated, and there can be no doubt that his great pupil, the "Venerable Bede," who was a monk in the monastery of Jarrow, was immensely indebted to them for the learning he acquired.

Benedict, David, American Baptist clergyman and historian. b. Norwalk, Conn., 10 Oct. 1779; d. 1874. He was pastor at Pawtucket, R. I., for 25 years, and preached till over 90 years of age. Among his chief works were 'History of All Religions'; 'Fifty Years Among the Baptists,' 'History of the Donatists.'

Benedict, Frank Lee, American novelist and poet. b. New York, 1834. Among his numerous novels are 'John Worthington's Name'; 'Miss Van Kortland' (1870); 'Her Friend Lawrence' (1879); 'The Price She Paid' (1883). A collection of his verses 'The Shadow Worshipper and Other Poems' appeared in 1857.

Benedict, Sir Julius, German-English pianist and composer. b. Stuttgart, 1804; d. London, 1885. In 1821 he went to Dresden to study under Weber, and two years later became conductor at a Vienna theatre. His first opera, 'Giacinta ed Ernesto,' was produced in Naples in 1829 without success. He took up his residence in England in 1835, and was knighted in 1871. He was for many years conductor at the Norwich festival, and during a number of seasons acted as operatic conductor in London, both for English and Italian opera. His principal works are the operas, 'The Gipsy's Warning' (1838); 'The Bride of Venice' (1843), 'The Crusaders' (1846); 'The Lily of Killarney' (1862), founded on Boucicault's 'Colleen Bawn,' and 'The Bride of Song' (1864); the cantatas, 'Undine' (1860) and 'St. Cecilia' (1866); the fine oratorio 'St. Peter' (1870); and the cantata 'Graziella' (1882).

Benedict-Buern, bĕ'nĕ-dikt-boi'ĕrn, formerly an abbey situated in the Bavarian circle of the Iser, about 40 miles distant from the city of Munich, on the descent of the mountains toward the Tyrol. The convent was founded as early as 740, and was abolished in 1803. The fine abbey church still remains. The Bavarian government has here a depot for army horses, and a veterinary establishment; and there is also a residence for invalids.

Benedic'tine, a liqueur originally prepared by the Benedictine monks of the abbey of Fécamp, in Normandy, consisting of spirit (fine brandy) containing an infusion of the juices of plants, and said to possess digestive, antispasmodic, and other virtues, and to have prophylactic efficacy in epidemics. It somewhat resembles chartreuse and has been made in the same way since 1510. See LIQUEUR.

Benedictines. From the 6th to the 10th century almost all the monks in the West might be so called, because they followed the rule of St. Benedict of Norcia. The rules which at that time the monasteries in Spain and France received from their bishops, as well as the rule of the Irish St. Columba, were essentially the same as those of St. Benedict; and in the progress of his order the monasteries in Spain and France, as well as those of the order of Columba, united themselves with it. Monte Cassino, the magnificent primitive monastery of the Benedictines, became the model of all others. At that time the monasteries, having no common supe-

riors, were under the immediate control of the bishops in their respective dioceses, and differed from one another in many qualifications of the primitive rule. Not even the color of their dress was the same. The disciples of Columba wore white garments like the first Benedictine nuns, who originated in France in the 6th century. After the unions which took place at a later period, all the members of this order wore black, as the founder is said to have done. The decline of monastic discipline after the 8th century occasioned the reforms of Benedict of Aniana in France, the renewed inculcation of the old rule, and the adoption of new ordinances suited to the times, by the Council of Aix-la-Chapelle (817), as well as the particular rules and fraternities of the celebrated monasteries in France, Germany, and England, which in those barbarous times became seats of civilization and finally the institution of the Cluniacs, a new branch of the Benedictines, which proceeded from the convent of Clugny in Burgundy, founded in the year 910. The Benedictine monasteries, in the Middle Ages, were often asylums in which science took refuge and found protection. In place of the discordant and uncertain rules which had hitherto existed, the Cluniacs made fixed regulations concerning the hours of worship, the obedience, discipline, and common government of all the monasteries belonging to their order, which were soon imitated in all Europe. In the 12th century their order contained 2,000 monasteries, whose luxury frequently called for reforms, and finally became the chief cause of their decline. The remains of the Cluniacs united themselves in the 17th century, under the patronage of Richelieu, with the Benedictine fraternities of St. Vannes and St. Maurus, the latter of which, founded in 1618, had in the beginning of the 18th century 180 abbeys and priories in France, and acquired by means of its learned members, such as Maillon, Montfaucon, and Martène, merited distinction. To this family belong those new orders established on the foundation and observing the rule of St. Benedict, which have originated since the 11th century, and are distinguished from the proper Benedictines by their dress, names, and particular regulations; for example, the Camaldulians, the monks of Valombrosa, the Sylvestrians, the Grandimontenses, the Carthusians, the Cœlestines, the Cistercians, and Bernardines, the Trappists, and the monks of Fontevraud. The Benedictine monasteries never constituted one society, constitutionally regulated and governed under an aristocratical or monarchical form; on the contrary, a great many monasteries which descended from the old Benedictines were compelled by the Council of Trent to unite themselves gradually into particular fraternities. Among these the Benedictines of Monte Cassino, of Monte Vergine, and Monte Oliveto (who called themselves *Olivetans*) in Italy and Sicily; those of Valladolid and Montserrat in Spain; those of Hirschau and Fulda in Germany, and that of Molk in Austria, deserve particular notice on account of the extent of their possessions, the magnificence of their churches, and the mildness of their rules. To the fraternity of Molk (or Melk), which still exists, but accommodated to the spirit of the times, the rest of the Benedictine convents in Austria are joined. Many of the nunneries of this order are reserved for the

BENEDICTION — BENET

nobility, because the places in them are equal to the most lucrative benefices. During the first French revolution the monasteries of the Benedictines along with all other monastic orders were abolished; but the Benedictines have since partially re-established themselves in France. In England the Benedictines were an important body at the dissolution of the monasteries, having then 186 abbeys, priories, and nunneries, besides many smaller houses. At present there are eight Benedictine abbeys in England, besides an extensive establishment at Fort Augustus in Scotland, comprising an abbey and college. In the United States there are 13 abbots, 545 priests, 133 clerics, and 345 lay brothers in the order. Two bishops are members of the order. The Benedictines have charge of 16 colleges in the United States.

Benediction, the act of blessing, of wishing to a person or thing the grace of God. It has always existed as a custom among Jews and Christians. The Jewish priests bestowed benedictions upon the people when they remained obedient to the law, and maledictions when they neglected it. The patriarchs, when near their death, invoked blessings upon their children and family, and at the same time pointed out the son who should succeed as head of the family and tribe. In the Roman Catholic Church, benedictions are of several kinds, and are performed either by sprinkling holy water, by signs of the cross, or by appropriate prayers. Three times a year, from the balcony in front of St. Peter's, the Pope solemnly gives his benediction, *urbi et orbi*, to Rome and to the world. In Protestant churches, the benediction is usually given in words similar to those prescribed by Moses to Aaron. It is often accompanied with laying on of hands, especially in the celebration of marriages, the ordination of pastors, the confirmation of converts, and the baptism of children.

Benedic'tus, the song of Zacharias used in the Roman breviary at lauds and also in the Anglican morning service.

Benedix, bā'ně-dīks, **Roderich**, German playwright and actor: b. Leipsic, 21 Jan. 1811; d. 26 Sept. 1873. In 1831, he became an actor, and in 1838 staged his first play 'Das Bemuste Haupt.' He was connected with the management of several theatres at Cologne and Frankfurt-on-the-Main. Among his plays are 'Dr. Wespe'; 'Die Hochzeitreise'; 'Die Mannersfeinde'; 'Der Liebesbrief'; 'Der Prozess'; and 'Die Sonntagsjäger.' His dramatic works were collected and published at Leipsic in 27 volumes. He has written also concerning German folklore.

Benefice (Lat. *beneficium*), an ecclesiastical living, originally including every species of preferment, as well as those to which dignities and offices were attached, namely, bishoprics, deaconries, and prebends, as the lesser sort, namely, rectories, vicarages, perpetual curacies, and endowed chaplainries; but in its popular acceptance it includes only the latter class, and the distinction is recognized in recent acts of Parliament. The name is derived from the *beneficium* of the Romans, a grant of any kind to a subject by the sovereign. It was afterward the designation of a grant of land by any large proprietor to a retainer or follower as a reward of services, being the same that later was de-

nominated a fief or fee, the essential incident of which was perpetuity, that is to say, it was a permanent stipendiary estate held of a superior, and usually subject to some condition indicating vassalage. The principle of the feudal tenure was applied, in the Middle Ages, to ecclesiastical benefices to this extent, that they were held of the Pope, as a superior lord, though these benefices had not the hereditary character of a fee, so far as respected the office or dignity connected therewith, and the lands or emolument conferred by a grant were usually attached to such office or dignity, and on the death of the incumbent, reverted to the ecclesiastical superior who was entitled to appoint a successor. This, at all events, was the claim of the Popes, though it was the subject of contest between them and the principal European sovereigns.

Benefit of Clergy, in English criminal law, the *privilegium clericale*, exemption of the clergy from penalties imposed by law for certain crimes. This privilege no longer exists, but it was for many centuries an important element in the administration of criminal law, and still is a curious and instructive part of the history of England. The origin of this privilege was a claim made by the ecclesiastics at an early period for the entire exemption of their order from the jurisdiction of the common law courts. In scattered instances the right was recognized in the colonies of Carolina and Virginia. An Act of Congress passed 30 April 1790 provided that benefit of clergy shall not be allowed for any offenses punishable by death. See Pollock and Maitland, 'History of English Law' (2d ed., 1899).

Beneke, bā'ně-kě, **Friedrich Eduard**, German philosopher: b. Berlin, 17 Feb. 1798; disappeared 1 March 1854; found drowned in a canal at Charlottenburg, 4 June 1856. After serving as a volunteer in the campaign of 1815, he studied theology and philosophy at Halle and Berlin, giving special attention to the English philosophers. In 1820 he lectured in the University of Berlin as a private teacher, but the continuance of his lectures was forbidden in 1822, on account of his departure from the philosophical principles of Hegel. He then taught for a few years in Göttingen, but, returning to Berlin in 1827, received permission to lecture in the university, in which he was elected extraordinary professor of philosophy after Hegel's death, in 1832. The starting point of his system is, that philosophy must be founded upon a strict and careful examination of the phenomena of consciousness. He thus adopts, in mental philosophy, the method observed by Bacon in the natural sciences, and his system is described as an empirical psychology. He was a voluminous writer and among his chief works 'Erfahrungs-seelenlehre, als Grundlage alles Wissens, in ihren Hauptzügen dargelegt' (1820); 'Neue Grundlegungen zur Metaphysik' (1822); 'Pragmatische Psychologie, oder Seelenlehre in der Anwendung auf das Leben' (1850).

Benet, **Stephen Vincent**, American military officer: b. St. Augustine, Fla., 22 Jan. 1827; d. 22 Jan. 1895. He was graduated at the United States Military Academy in 1849, and assigned to the Ordnance Department; was assistant professor of ethics and law at the Military Academy in 1859-61; instructor of ordnance in 1861-4; became brigadier-general and chief of

BENEVENTO — BENGAL

ordnance in 1874; and was retired in 1891. He was author of 'Military Law and the Practice of Courts Martial' (1862); 'Electro-Ballistic Machines and the Schultze Chronoscope' (1866); and a translation from the French of Jomini's 'The Campaign of Waterloo.'

Beneven'to, a province of Italy, with an area of 680 square miles, and an archiepiscopal city. The surface of the province is hilly but the soil fertile in corn, fruit, and pasture. Game is very abundant, and cattle, grain, wine, oranges, and dead game are exported. Benevento was originally called Maleventum; but this was changed to Beneventum by the Romans when they founded a colony here after the defeat of Pyrrhus. Before it came into the hands of the Romans it belonged to the country of the Samnites. The Lombards in 571 made it a dukedom, which, long after the extinction of the Lombard kingdom, remained independent. At a later period it fell into the hands of the Saracens and Normans. The city, however, was not conquered by the latter, because Henry III. had given it to the Pope, Leo IX. In 1418 Benevento became part of Naples, but was given back to the Pope by Ferdinand I. In 1708 it was conquered by the French, and handed over to Naples; and then in 1806 Napoleon made a present of it to his minister Talleyrand, who received thence the title of Prince of Benevento. In 1815 it was restored to the Pope, and finally with Naples was annexed to the kingdom of Italy. The city of Benevento is situated on a hill between the rivers Sabato and Calore, is surrounded with a wall, has narrow dirty streets and some interesting buildings. Since 969 it has been the see of an archbishop. Few cities in Italy deserve so much attention on account of the antiquities which they contain as Benevento. Almost every wall consists of fragments of altars, sepulchres, columns, and entablatures. Among other things the well-preserved, magnificent triumphal arch of Trajan, built in 114, deserves particular mention. It is now called *Porta Aurea* (the golden gate), and is a gate of the city. The cathedral is a beautiful building in the Lombard-Saracenic style. Pop. (1901) 24,647.

Benevolence, a forced loan or contribution, by which the kings of England were wont, without any sanction from Parliament, to levy money from their subjects. Such benevolences had been denounced by Magna Charta; and even Richard III. had allowed the only Parliament of his reign to enact a statute declaring them illegal; but they still continued under some shape or other till finally abolished by the Bill of Rights in 1689.

Benezet', Anthony, American Quaker philanthropist; b. St. Quentin, France, 31 Jan. 1713; d. Philadelphia, 3 May 1784. His family came to Philadelphia from London in 1731. He earnestly opposed the slave trade, advocated the emancipation and education of the colored population of the colonies, and himself opened an evening school for negroes. Of his numerous tracts, distributed gratuitously, the most important are: 'A Caution to Great Britain and Her Colonies, in a Short Representation of the Calamitous State of the Enslaved Negroes in the British Dominion' (1767); 'Historical Account of Guinea' (1772); 'A Short Account of the Society of Friends' (1780); 'Dissertation on the

Christian Religion' (1782); 'Observations on the Indian Natives of this Continent' (1784).

Benfey, bēn'fi, Theodor, German Orientalist and comparative philologist: b. of Jewish parents, Norlen, Hanover, 28 Jan. 1809; d. 26 June 1881. He studied in Gottingen, Munich, Frankfurt, and Heidelberg, devoting himself especially to classical and comparative philology. In 1862 he was appointed to the chair of Sanskrit and comparative philology in the University of Gottingen, which he held till his death. One of his earliest literary efforts was a translation of 'Terence' (Stuttgart 1837); after this, however, he turned his attention almost exclusively to comparative philology, Oriental languages, especially Sanskrit, and mythology. In his 50 years devoted, with rare enthusiasm and persistency, to linguistic studies, he did more than any other scholar to enlarge the boundaries of Sanskrit philology. In comparative philology, though an adherent of Bopp, he deviated from his master in deriving all Indo-European words from mono-syllabic primitive verbs. This conception depends on his theory of the origin of stem suffixes. These, he holds, are almost all derived from a fundamental form, *ant*, which appears in the present participle of verbs. To support this view he assumes the most violent permutations of sounds, which set all phonetic laws at defiance. For his theory, see his 'Lexicon of Greek Roots' (1839); 'Short Sanskrit Grammar' (1868), and numerous essays. In Sanskrit he laid a foundation for the true study of the Veda by editing the 'Sāma Veda' (1848), with glossary and translation; and this work he continued by a scholarly translation of the first *mandala* of the Rīg Veda in his magazine, 'Orient und Occident' (1863-4). His Vedic grammar, for which he had been collecting materials for many years, was left unfinished. He also published a 'Complete Sanskrit Grammar, Crestomathy and Glossary' (1854), and a 'Sanskrit-English Dictionary' (1866). In comparative folklore his principal work is a translation of the 'Panchatantra,' (1859). It is accompanied with elaborate notes, and the first volume consists entirely of an introduction in which he traces the course of these Indian stories in their wanderings and transformations both in eastern and western literatures.

Benga, an African tribe, living on the Spanish island, Corisco, off the western coast, having moved from the interior within a few generations. The American Presbyterian Board of Missions have Christianized many of the Bengas and translated books into their language, which closely resembles the Kamerun and Dualla.

Bengal (Hind. *Bangālā*, Skt. *Vangalam*, from *Vanga*). In the widest application the name presidency of Bengal is extended to the whole of British India, except what is under the governors of Madras and Bombay; so that it includes the provinces of Ajmir and Meirwar, Coorg, and Berar, which are under the direct administration of the governor-general; the lieutenant-governorships of Bengal, the Northwest Provinces and the Panjab; the chief commissionerships of Assam, Central Provinces, and Oudh, besides various native states, etc. But the name is now usually restricted to that portion which is under the lieutenant-governor of Ben-

BENGAL

gal, and which occupies the northeast of India, comprising the following divisions:

Divisions	No. of dists.	Area in sq. m.	Population in 1891
Burdwan	6	13,855
Presidency	5	12,029	16,145,310
Rajshahi	7	17,428	8,003,740
Dacca	4	15,000	...
Chittagong	4	12,118	13,965,230
Patna	7	23,647	..
Bhagalpur	5	20,492	24,284,370
Orissa	5	9,053	3,865,020
Chota Nagpur	4	26,966	4,645,590
Total	47	150,588	70,909,260

The total population in 1901 amounted to 74,713,020.

The district composed of the first five of the above divisions forms the province of Bengal proper; Patna and Bhagalpur form the province of Behar. Besides these the lieutenant-generalship includes four native states under British protection, namely, Cooch Behar, Hill Tipperah, Chota Nagpur (part of), and Orissa (part of), having a total area of 37,515 square miles, and a population in 1891 of 3,428,390.

The general physical character of Bengal is that of a practically level country, though it is surrounded with lofty chains of mountains; the northern part rests on the terraces of the Himalaya Mountains, the east is bounded by the Garos or Garrows chain, and the west is ribbed with offsets of the Vindhya Mountains. It is intersected in all directions by rivers, the principal of which are the Ganges and Brahmaputra, whose annual inundations render the soil which they reach extremely fertile. In those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth. The most inhospitable part of Bengal is what is called the Sunderbunds (from being covered with the soondru or sunder tree), that portion of the country through which the numerous branches of the Ganges seek the sea, or the space lying between the Hoogly River and Chittagong, about 150 miles from east to west, and about 160 from north to south. This district is infested with tigers, is traversed in all directions by water-courses or nullahs, and interspersed with numerous sheets of stagnant water called jheels, which abound with fish and water-fowl, and are much resorted to by crocodiles.

Geology and Minerals.—In the northern part of Bengal, at the foot of the Himalayas, is a band of Tertiary formation; south from which, and along the course of the Ganges, more especially east from that river, and including the greater part of its delta and that of the Brahmaputra, the country is wholly composed of alluvium or modern detritus. Calcutta stands upon strata of the transition series, which stretch west into Bahar, and are flanked north and south by tracts of crystalline formation. In the Garo Hills coal, iron, and limestone are found; and nitre effloresces on the surface around Calcutta and elsewhere. Mineral springs are not numerous.

Rivers.—The principal rivers, besides the Ganges and Brahmaputra, the latter of which enters the province at its northeast extremity, and falls into the Bay of Bengal near the principal embouchure of the Ganges, are the Soobunreka, which falls into the Bay of Bengal, in lat. $21^{\circ} 35'$ north, south-southwest of the Hoogly; the Cusi or Coosee, which rises near

Khatamandoo in Nepal, and falls into the Ganges near Bhagalpur, in lat. $25^{\circ} 20'$ N.; and the Dumooda, which, rising in Bahar, falls into the Hoogly about 22 miles below Calcutta. There are numerous other streams of less note, mostly tributaries of the Ganges and Brahmaputra, or their larger affluents.

Climate.—There is more regularity in the changes of the seasons in Bengal than perhaps in any other part of India; but it is subject to great extremes of heat, which, added to the humidity of its surface and the heavy dews that fall, render it generally unhealthy to Europeans. The prevalence of hot winds, which are sometimes loaded with sandy particles, is another source of disease. The seasons are distinguished by the terms hot, cold, and rainy. The hot season continues from the beginning of March to the end of May, within which period the thermometer frequently rises to 100° , sometimes to 110° . The month of September is also often intensely hot, and when so is the most unhealthy period of the year to natives as well as Europeans, owing to the profuse exhalations from stagnant waters left by the inundations, and from a rank decaying vegetation. The rainy season commences in June, and lasts till October. During the first two months of this period the rain is frequently so heavy that five inches of water have fallen in one day, the annual average being from 70 to 80 inches. It is in this season that the inundations take place, and that the Ganges overflows its delta, covering the land with its waters for more than 100 miles. The cold season, the most grateful and healthy of any to Europeans, continues from November to February, during which period north winds prevail, with a clear sky.

Forests.—In Bengal, as in India generally, great attention has been paid of late to the management of forests. Great destruction is caused among forests by fires, which are sometimes the result of accident, but more frequently made purposely by the natives in pursuance of a system of jungle cultivation that appears to prevail throughout India. This consists in cutting down and burning a patch of forest, and raising a crop in the open space, no plowing or digging being necessary. The next year this patch is abandoned, and another treated in the same way. Another cause of destruction is the wastefulness of those who use the timber. The sunder-trees, for example, which furnish the best wood for the boats which are built in great numbers throughout Eastern Bengal, have been cut down in so reckless a manner that the western parts of the Sunderbunds have already been to a large extent exhausted. In order to limit the destruction that goes on by such proceedings certain portions of the Indian forests are reserved and placed under the entire control of the government, and additions are made to these reserves every year. Of the total 11,669 square miles of forest in Bengal, in 1896 5,877 were reserved and 3,437 protected.

Animals.—Among the wild animals are tigers, elephants, boars, bears, wolves, foxes, jackals, hyenas, leopards, panthers, lynxes, hares, deer, buffaloes, antelopes, and monkeys. The most formidable of all these animals (and more so even than the lion) is the tiger, which here attains its utmost size, and perhaps also its greatest ferocity. The domestic animals include native horses, thin, ill-shaped animals, and not

BENGAL

well adapted for any kind of labor; cattle, of a very inferior breed, being extremely small and miserable looking; sheep likewise of diminutive size, with very coarse hairy wool, but when well fed their flesh is excellent. Hogs and goats are also plentiful, and buffaloes are domesticated for the sake of their milk. Reptiles are numerous and formidable, including gavials, a kind of crocodile, with which the larger rivers are infested; and among the serpent tribe, many of which are highly poisonous, the deadly cobra-de-capello. Turtles, frogs, and lizards also abound, with swarms of mosquitoes. The turtles are chiefly procured from the island of Cheduba, in the Bay of Bengal. Fish are so exceedingly plentiful as to be within the reach of almost every class of inhabitants. Game, poultry, and water-fowl of all descriptions abound in Bengal, particularly ducks, of which there is a great variety, and most of them of a superior kind. The gigantic crane, commonly called the adjutant, from the stately air with which he struts about, frequents the towns in considerable numbers, performing the office of scavenger by clearing the streets of garbage, in consideration of which duty he enjoys an entire immunity from all disturbance; his principal food is offal, toads, lizards, serpents, and insects. Crows, kites, sparrows, and other small birds are numerous.

Agriculture.—The staple crop of Bengal is rice, which is cultivated so as to produce three harvests in the year—spring rice, autumn rice, and winter rice. The last of these harvests is by far the most important. Besides sufficing for the wants of the population the rice crop leaves a large surplus for exportation. Oil seeds are also largely cultivated, chiefly mustard, sesamum, and linseed. The jute plant (*pât*) has long been cultivated, and in recent times the cultivation of it has greatly extended. It will grow on almost any description of land. Part of this crop is cultivated by those who use or manufacture it, almost all the Hindu farmers weaving cloth from it. It is now manufactured also in large mills under European management, and jute goods are now an export of some importance, though not nearly so much so as jute in the raw state for manufacture in Europe. The sunn plant, somewhat resembling the Spanish broom, is now quite extensively cultivated and exported to Great Britain, affording excellent material for both sails and cordage, and being made into fishing nets by the natives. Cotton is grown over all India, but the best of the herbaceous kind is raised in Bengal and on the Coromandel coast; the finest grows on light rocky soil. The cotton of India is generally inferior to that of the United States; but this is believed to be wholly owing to careless cultivation, and to the slovenly manner in which it is prepared for the market. The cultivation of the date palm and the manufacture of date sugar are carried on to a considerable extent, forming a profitable business for the cultivator. This kind of sugar forms an article of export. The sugar cane is cultivated, but not nearly to such an extent as might be expected. There are two kinds of sugar cane, a yellow hard cane, about the thickness of a finger; the other much thicker and deeply stained with purple. The latter is the most productive, but the most troublesome to cultivate, and therefore avoided by the more indolent farmers. Tobacco, which requires a light soil, is grown in three different

situations,—in rich spots of land contiguous to the farmer's house,—in high land suitable for the growth of sugar cane,—and on the banks of rivers. The betel leaf, famous for its intoxicating quality and largely used over all India on that account, is cultivated in what is called a *voraj* or fort, and is carefully protected from the sun and wind. Indigo being one of the principal articles of foreign commerce with Bengal, is extensively cultivated in that province. The opium production of Bengal was a government monopoly under Mohammedan rule, and has been retained as such by the British. All the juice of the opium poppy must be sold to the government at a fixed price. This cultivation is carried on in the west of Bengal in the divisions of Chota Nagpur and Patna. Orchards of mango trees are to be found in every part of Bengal, the fruit being in general demand during the hot months. The cinchona tree and the tea plant have both in recent times been added to the agricultural products of Bengal; the former in the native state of Sikkim, the latter especially in Cooch Behar (Darjiling), Chittagong, and Chota Nagpur.

The luxuriance of vegetation in Bengal is perhaps unequaled in any other part of the world. The cultivation of the land requires little effort, and large crops are obtained without the application of any other manure than the sediment or mud deposited by the inundations. It is doubtful, however, how far this facility is good, since it seems to have had the effect of preventing all attempts at improvement either in the science of agriculture itself or in the implements used in its practice. The Indian plow is of wretched construction, having neither colter nor mold-board, and in some districts it wants even the share, while the animals by which it is dragged, two oxen or cows, are miserable half-starved creatures. The reaping hook (*kasty*) is a most inefficient implement,—the curved or cutting part of the blade is six inches long by one and a half broad, with teeth like a saw—the handle is about four and a half inches long. The *dengki*, by which the husks are separated from the grain, is another wretched implement, and so ill adapted to its purposes that one fifth part of the whole grain is sacrificed in the operation. Nearly all the other implements in use are of an equally rude and imperfect description. Rotation of crops and the use of fallows are unknown to the farmers of India; the land is generally in an exhausted condition, and the enclosures everywhere bad. Grain is trodden out by oxen, and stacking corn is unusual, the corn being often left exposed to the weather. Irrigation, however, is well understood,—necessity giving rise to invention,—and is accomplished by the most ingenious and efficient means.

Manufactures.—The principal manufacture of Bengal is that of cotton goods, including cotton piece goods of various descriptions, calicoes, thread, and sail-cloth. Muslins of the most beautiful and delicate texture were formerly made at Dacca, a city in this province, but the manufacture is almost extinct. "Some of these fabrics," says Tavernier, "were so fine that they could hardly be felt in the hand, and the thread when spun was scarce discernible." In Ward's 'History' of the Hindus this character in the muslin of Dacca is confirmed; though perhaps in both cases it is a little exaggerated. "When

BENGAL

this muslin is laid on the grass," says the latter, "and the dew has fallen on it, it is no longer discernible." The extraordinary fineness and beauty of India muslins, manufactured under the disadvantages of rude machinery and ill prepared material, is attributed to the exquisitely fine sense of touch possessed by the Hindus, and to the hereditary continuance of a particular species of manufacture in families through many generations.

The modern decay of the muslin manufacture of India has been owing in a great measure to the successful competition of Great Britain, and to the circumstance of British fabrics being subject to no duty in Bengal, while high duties were levied on the fabrics of Bengal in Great Britain. These duties are now abolished. Large quantities of a coarse cloth, manufactured from jute, are made in various districts of Bengal. Sericulture is carried on more largely in Bengal than in any other part of India, and silk-weaving is still a leading industry in many of the districts; but of late years there has been a serious decline. One branch of this industry, however, seems more flourishing than some others, namely, the cultivation of *tasar* or wild silk, the worm that produces it feeding upon the leaves of the sal and other forest trees. On the other hand, various new manufactures, carried on by machinery, are rising up. The most important of these are the industries connected with jute, cotton, and sugar. These are already affording employment to many thousands, and the natives are said to show great aptitude for factory work. The jute mills alone employ nearly 40,000 hands.

Commerce.—The commerce of Bengal, both internal and external, is very large. Multitudes of native boats and other craft navigate the rivers. The imports to Calcutta from the interior have been valued at over \$13,000,000, consisting of rice, tea, jute, indigo, linseed, mustard seed, wheat, etc. The foreign trade is large and increasing. Almost the whole of it passes through Calcutta, and the value of it annually is over \$275,000,000, over \$170,000,000 being exports. The most important exports are opium, jute, indigo, oil seeds, tea, hides and skins, and rice; the chief import is cotton piece goods. The foreign trade is chiefly with Great Britain, China, the Straits Settlements, France, the United States, and Ceylon.

Finance.—The total revenue of the lieutenant-governorship of Bengal in the year ending 31 March 1898, was (calling the rupee 25 cents), \$101,442,465, and the total expenditure \$51,620,525. The surplus goes to meet the expenses of the general government of India. The principal sources of revenue are land, salt, opium, excise, stamps, and customs, assessed taxes, etc.

Education, Social, and Domestic Conditions, etc.—It is one of the consequences of the extreme poverty of the bulk of the population of Bengal, that education should be there at a very low ebb. The proportion of boys of school-going age attending school is only about 28.6 per cent; of girls 2 per cent. The first rudiments of education are often given in small schools called *páthsálas*, in which the fees are extremely low, and in which only reading, writing, and arithmetic are taught. The greater number of these, although private establishments, receive aid from government. In the

primary schools the principle of keeping the standard of instruction as low as possible is adhered to; and this is intended to be done till the whole of the poorer classes shall have been brought under some kind of instruction. In the meanwhile, all who have time or means for learning more are encouraged to resort to schools of a better class. With this view a system of intermediate schools was established in 1875 between the primary and what are called the middle schools, and this step has been rewarded with a satisfactory measure of success.

In addition to the schools already mentioned there are various educational institutions of a higher kind connected with government. The highest of these institutions is the Calcutta University, with the four faculties of arts, law, medicine, and engineering. Affiliated to the university are a number of general and professional colleges, in one of which all who have passed the university entrance examination and wish to proceed to a degree must enroll themselves. The majority of educated Bengal youths, according to official information, resort to two professions, the public service and the law, in consequence of which many cannot obtain employment. With a view to open out other lines of employment the government is endeavoring to establish technical and industrial schools of a superior kind in many places. A healthy ambition is said to exist among the natives of Bengal to raise themselves by education. Almost every Bengalee youth who can afford the means aspires to an English education as one of the main objects of his life. One result of the Prince of Wales' visit to Bengal at the end of 1875 was that the wealthier natives raised subscriptions to commemorate the event by founding educational institutions. The secondary schools are generally divided into "English" and vernacular. Those in which English forms part of the regular course of study of all the scholars, or at least of all in the higher classes, are reckoned as English; if English is optional only, they are reckoned as vernacular. In the common languages of the country there were till lately almost no books to be had; but the Bible, or parts of it, has now been printed in the various languages and widely circulated, as well as a number of other works.

The private houses of Bengal are huts, with pentroofs constructed of two sloping sides which meet in a ridge. One hut of this kind serves the poor man for himself, family, and cattle; wealthy men increase the number of houses without altering the plan, and without having any communication between the different apartments. The walls are generally made of mud, and the floor is raised a foot or two above the level of the plain, to prevent it being flooded in the rainy season, which, however, is not always accomplished. The frames of the houses consist of bamboos tied together—wooden posts and beams being used in the construction of the houses of the wealthy only. The huts collectively sufficient for the accommodation of a family are usually surrounded by a common fence. Farmers have in general larger and better houses than people living in towns. A rich farmer will sometimes have as many as 12 or 14 huts within his enclosure. The food of the class just above the rank of common laborers consists chiefly of rice, wheaten flour, fish, vegetables, and butter, with various condiments and seasonings.

BENGAL — BENGALI

In the case of the laborer there is neither flour, fish, vegetables, nor butter, the chief food of that class being a coarse description of rice.

History.—The English first got a firm footing in Bengal about 1644, when, through the influence of an English medical man named Boughton, a favorite of the emperor of Delhi, the East India Company obtained permission to locate themselves at Hugli or Hoogly, some 28 miles above Calcutta. In 1686 the company's factors, having had a rupture with the Moslem commander at the place where they were located, removed to Calcutta, then the village of Chut-tanuttu, where they continued to carry on their trade. In 1700 the viceroy of Bengal, being in want of money to dispute the succession to the Mogul throne, obtained a large sum from the company for the township on which their factory stood at Calcutta, and some adjacent lands. Seven years afterward, namely in 1707, Calcutta was erected into a presidency, and the foundation of British power in India laid—presenting a striking proof of the energy of the British character, there having been settlements in India by the Portuguese, Dutch, French, and Danes, previous to, and contemporary with, the location of the English in that quarter of the world; but the mighty achievement of obtaining the supremacy in that vast empire could, it appears, be accomplished only by the British. For nearly half a century the company pursued a peaceful and profitable commerce; but at the expiration of that period, 1756, Calcutta was attacked and taken by the Soubahdar of Bengal, who threw the Englishmen he found there, 147 in number, into a dungeon, the well-known "black-hole" of Calcutta, where 123 of them perished in 11 hours. In the ensuing year Calcutta was retaken by Lord Clive—an event which was followed by a series of victories on the part of the British, that terminated in the entire conquest of India. In consequence of unprecedented drought great scarcity of food prevailed in 1873 and 1874, but the prompt measures of the government were sufficient to prevent any widespread mortality. A bill conferring upon agricultural tenants a transferable interest in their holdings and protecting them against eviction was passed in 1885.

Bibliography.—Barton, 'Bengal'; Hunter, 'Statistical Account of Bengal'; Rawlinson, 'England and Russia in the East'; and official 'Reports on the Administration of Bengal,' appearing annually.

Bengal, Bay of, that portion of the Indian Ocean between Hindustan and Farther India, or Burma, Siam, and Malacca, and extending south to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawadi. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts. On the west coast there are no good harbors, but the east coast has a considerable number, among them being Aracan, Cheduba, Negrais, Mataban, and Syriam. On account of the extreme heat the rate of evaporation is very high, sometimes amounting to an inch per day. The tide sometimes rises to the height of 70 feet. In summer the northeast monsoon prevails, and in winter the southwest monsoon.

Bengal, or Bengola, Light, a firework, giving a vivid and sustained blue light. It is used for signals at sea. It is composed of six

parts of nitre, two of sulphur, and one of anti-mony tersulphide. These are finely pulverized and incorporated together, and the composition pressed into earthen bowls or similar shallow vessels.

Bengali, bēn-gā'le, the dealer's name, originating in a mistake as to their origin, for any of several of the beautiful little African wax-bills (q.v.), bred and sold as cage-birds; especially the "blue-bellied finch" (*Estrilda bengala*), which is ashy-brown above, with the wing quills brown, and the sides of the head, the throat and whole lower surface azure blue, spotted under and near the wings. They add to this charming dress lively manners and an agreeable song. Their requirements in the cage are like those of a canary.

Bengali Era, The, one of the chronological eras of the Hindus, supposed to have been derived from the Hegira. The Hindus, however, use the sidereal year, and the Mohammedans the lunar, hence the Mohammedan epoch is at present some nine years in advance of the Bengali.

Bengali, or Gaura, Language, one of the five modern languages of Hindustan, which are derived from the ancient Sanskrit. Its name is derived from Banga, the Sanskrit name of the country, with the Arabic article *al* suffixed; the whole being corrupted into the present form. Gaura is derived from Gaur, the name of the ancient metropolis. It is spoken by 42,000,000 of British subjects, of whom about one fourth speak also some other dialect. It extends over the regions on the lower Ganges, from Patna down to its delta, being purest in the province of Bengal and in the eastern regions. This language consists of an aboriginal basis, with which a much greater portion of Sanskrit and Pracrit has been admixed than with any one of its cognates, with a considerable addition of Afghan, Persian, Arabic, Portuguese, Malay, and English words. Although the Sanskrit element predominates as regards the words, the grammatical forms of the language differ more from the Sanskrit than the forms of the Greek, Latin, Gothic, and Persian; most of the flexions of nouns and verbs having been lost, and their places being supplied by auxiliary words and by circumlocution. Notwithstanding this, it admits in the higher style, many of those forms which are intelligible only to more cultivated persons. There are no forms of gender, and only few feminine words are formed by the suffixes *i* and *ini*. There are seven cases made by suffixes—nominative, accusative, instrumental, dative, ablative, genitive, and vocative. The plural of nouns is made by suffixing *dig* to the genitive singular. It delights in compound words, formed especially by means of a sort of past participle; elegant Sanskrit compounds being unidiomatic. There is but one conjugation, whose radical is the imperative. Compound tenses are made by the auxiliaries, meaning to do, to be, to become. The singular and plural of verbs are often confounded; the plural with a singular noun denoting respect, the singular with the plural noun being used in speaking to inferiors. There are three simple moods, infinitive, indicative, imperative; four others being periphrastic, the potential, optative, inchoative, and frequentative. Any verb is conjugable negatively by the suffix *na*. The system

BENGAZI — BENHAM

of writing is that of the *dēvanāgarī* of the Sanskrit language, but the forms of letters are more broken and twisted. B and v, however, are written by one character, and the characters of the sounds, s, z, sh, are interchangeable.

No book written in Bengali appeared before 1500 A.D. After the settlement of Moslems in Gaur, the Voisyas and Soodras (agricultural and servile castes) began to study Persian, to gain a livelihood, and were well rewarded by the conquerors. Except the stories of Krishna's study, the rules of arithmetic in verse, and a few other elementary books, the vernacular literature was very poor, until Rajah Krishnachandra Roy Bahadoor restored Hindoo literature in India, by bringing in pundits and endowing schools. Owing to the abundance of Sanskrit books, and the prejudice of most Brahmins against the Bengali, this was neglected until 1800, when the college of Fort William was founded, and the study of Bengali was made imperative and collateral to the Sanskrit. Many Bengali works have since been printed at Calcutta and Serampore. The first native newspaper was published at Serampore in 1818. Considerable change has been made since in the diction and composition of this language, which continues to be enlarged and ennobled, by being capable of borrowing indefinitely from the venerable Sanskrit mother. Gilchrist, H. P. Forster, Carey, W. Morton, Hunter, Mohun Persaud, Tahur, Tarachand Chukruburti, Sir G. C. Haughton, have published Bengali English dictionaries and vocabularies, and Ram Comul Sen has translated Todd's edition of Johnson's English dictionary into Bengali.

Bibliography.—Beames, 'Comparative Grammar of the Modern Aryan Languages of India'; 'Grammar of the Bengali Language'; Cust, 'The Modern Languages of the East Indies'; Dutt, 'The Literature of Bengal'; Nicolls, 'Manual of the Bengali Language'; Yates Wiegler, 'Introduction to the Bengali Language'.

Bengazi, bēn-ga'ze, or **Benghazi**, a town in North Africa, capital of the vilayet Barca, on the east coast of the Gulf of Sidrah. Next to Tripoli it is the most important seaport on this coast. The harbor is fast silting up, and admits only small vessels; but there is still a considerable trade, cattle, corn, etc., being exported, especially to Malta. It is sometimes identified as the ancient Hesperides and in the time of Ptolemy III. was called Berenice. Pop. about 15,000.

Bengel, bēng'el, **Johann Albrecht**, German theologian and philologist: b. Winnenden, Wurtemberg, 24 June 1687; d. Alpirsbach, 2 Nov. 1752. He studied at Stuttgart and Tübingen, and became pastor and head of a school at Denkendorf. He especially applied himself to the critical study of the Greek Testament, of which he published an edition in 1723. Among his other works are 'Apparatus Criticus Novi Testamenti,' a work of great value for its suggestive condensed comments, which first appeared in 1742, and has been several times reprinted, etc. An attempt has been made to adapt his 'Gnomes' to English readers in the 'Critical English Testament,' by Blackley and Hawes (1866).

Benger, bēng'gēr, **Elizabeth Ogilvy**, English historical writer: b. Wells, Somersetshire,

1778; d. London, 9 Jan. 1827. She early displayed a turn for literature, but her straitened means preventing her from gratifying this taste by the purchase of books, she was in the habit of perusing the opened books in a bookseller's window, and would return day after day to see it the page had been turned over. In 1802 she removed with her mother to London. Her first literary attempts, including a poem on the abolition of the slave trade, and two novels, attracted little attention; but she was more successful with her 'Memoirs of Mary Queen of Scots,' and of 'Elizabeth Queen of Bohemia.' She also wrote the Lives of Anne Boleyn, Mrs. Elizabeth Hamilton, and John Tobin, the dramatist. Her chief merits are a clear style and industry in the collection and arrangements of facts.

Bengough, John Wilson, Canadian poet: b. Toronto, 5 April 1851. In 1873 he established the *Grip*, a humorous weekly in Toronto. His political cartoons in this paper were highly artistic. He is also widely known as a lecturer and a poet. His publications include: 'Ontario, Ontario' (a famous election song); 'Grip's Cartoons' (1875); 'Popular Readings, Original and Selected' (1882); 'Caricature History of Canadian Politics' (1886); 'Motley: Verses Grave and Gay' (1895); 'The Up to Date Primer: A First Book of Lessons for Little Political Economists' (1896); etc.

Benguela, bēn-gā'la, or **Benguella**, a district belonging to the Portuguese on the western coast of South Africa, forming one of the three provinces of Angola; bounded north by the province of Loanda, south by that of Mossamedes, and west by the Atlantic Ocean. The interior of the country is mountainous, the direction of the elevated lands being from northeast to southwest. It is well watered, being intersected by numerous rivers and streams. Its vegetation is luxuriant, and it possesses extensive forests. Its products are those of tropical Africa generally. Coffee grows wild. The soil in parts is well adapted for the production of grain; but little is grown. The larger animals of Africa are numerous, such as lions, elephants, and hippopotami. The minerals include copper, sulphur, lead, gold, and silver. The only town worth mention is the seaport, Benguela, founded in 1617 as San Felipe de Benguela, which is pleasantly situated and fairly healthy. It exports rubber, coffee, skins, ivory, etc. A short railway starts from the town, the population of which is about 3,000. The population of the province may amount to several millions.

Benhadad, the name of three kings of Syria, all mentioned in Scripture. The most conspicuous is the second, who was equally remarkable for his arrogance in prosperity and his craven spirit in adversity. He first sent an insolent message to Ahab, claiming himself and all his subjects as his slaves; and after Ahab encountered and defeated him, Benhadad sent a message abjectly begging his life. Ahab was impolitic enough to grant it, and Benhadad, disregarding all his promises, proved a bitter enemy to his successor. He was at last murdered by his captain, Hazael, about 890 B.C.

Benham, Andrew Ellicott Kennedy, American naval officer: b. New York, 10 April 1832; entered the navy in 1847; served in the East India and the Home squadrons in 1847-52;

BENHAM — BENIN

attended the United States Naval Academy, 1852-3; was commissioned lieutenant in 1855; lieutenant-commander in 1862; commander, 1866; captain, 1875; commodore, 1885; and rear-admiral in 1890, and retired in 1894. During the Civil War he served in the South Atlantic and West Gulf Blockading squadrons. In April 1893 he commanded one of the divisions in the great naval display at New York; in 1894, as commander of a squadron at Rio de Janeiro, Brazil, he forced the commander of the insurgents' squadron to raise the blockade of the city and to discontinue firing on American merchant vessels; and in 1898 was naval prize commissioner in Savannah, Ga.

Benham, Henry W., American military engineer. b. Cheshire, Conn., 1816; d. 1 June 1884. He was graduated at the United States Military Academy in 1837; and became brevet major-general, United States army. He commanded the engineer brigade and laid several pontoon bridges under fire during the Chancellorsville battles; constructed and commanded the defenses at City Point; devised the picket shovel; and made many improvements in the construction of pontoon bridges, in which he was a recognized expert. After the war he was in charge of the Boston harbor sea wall and later of the New York harbor defenses; retired from active service, 1882.

Benham, William, English clergyman and author. b. West Meon, Hampshire, 15 Jan. 1831. He was vicar of Addington, 1867-73; of Margate, 1873-80; of Marden, 1880-2; and rector of St Edmund's, Lombard Street, London, from the year last named. He was appointed canon of Canterbury in 1885. He has published among other works: 'The Church of the Patriarchs' (1867); 'Catharine and Crawford Tait'; 'How to Teach the Old Testament' (1881); 'Annals of the Diocese of Winchester' (1884); 'A Short History of the Episcopal Church in America' (1884); 'The Dictionary of Religion' (1887); 'Life of Archbishop Tait,' with Davidson (1891). He has edited the 'Ancient and Modern Library of Theological Literature.'

Beni, bā'ne, one of the nine departments of Bolivia, South America. It is in the northeastern part, with an area of 100,580 square miles. It is a level, fertile region, growing cocoa, coffee, sugar-cane, and tobacco, and containing vast forests of rubber-trees, and rich deposits of gold. Pop. 26,750; chief town, Trinidad.

Beni, a river of South America, formed by the junction of several streams flowing eastward from the Andes in about 18° south. Its course is north and northeast through Bolivia; and on the border of Brazil it unites with the Mamoré to form the Madeira, by which its waters are carried to the Amazon. It receives several tributaries of importance, the chief being the Madre de Dios from Peru, and it is navigable throughout a great part of its course. Its length is about 850 miles.

Beni-Hassan, bā'ne-hās'san, a village of middle Egypt, on the east bank of the Nile, remarkable for the rock-hewn tombs in the neighborhood, supposed to have formed a necropolis for the chief families of a city, Hermopolis, on the opposite bank, and exhibiting interesting paintings, and hieroglyphics. The paintings portray incidents in the ancient life of Egypt, and the inscriptions are of great

value for the light they throw upon the history of the 12th dynasty.

Beni-Israel, bā'ne-iz-rā-ēl, a race in the west of India (the Konkan sea board, Bombay, etc.), who keep a tradition of Jewish origin, and whose religion is a modified Judaism. By some persons they are supposed to be a remnant of the 10 tribes. Their number is estimated at 5,000, and in feature they resemble the Jews of Arabia.

Beni Israel, a small antelope. See MADOQUA.

Beni-Khaibir (sons of Keber), an Arabic tribe supposed to be a remnant of the ascetic tribe of Rechabites.

Beni-Mzāb, a race or tribe of Berbers that dwell in the Sahara, near its northern border, and recognize the supremacy of the French. They number some 60,000, of whom about 15,000 are in the town of Ghardaya. They are peacefully disposed, and numbers of them are employed in Algiers in various occupations.

Beni-Suef, bā'ne-swāf, the capital of a province of the same name in Egypt; is pleasantly situated on the left bank of the Nile, 70 miles south from Cairo, with which it is connected by railway. It is the entrepôt for the produce of the Fayoum, and contains cotton mills, controlled by the state, and alabaster quarries. Pop. 10,085.

Benicarlo, bā-ne-kar-lō', a seaport of Spain, in Valencia, in the province of Castellon, surrounded with walls, having an old castle, a fine church, with an octagonal tower, and some manufactures, etc. It is chiefly noted as being the place of export of the red wines called by its name which are produced in the surrounding country. These are chiefly sent to Bordeaux to be mixed with clarets, or to England to be manufactured into port. Pop. (1897) 7,900.

Benic'ia, Cal., a city in Solano County, at the mouth of the Sacramento and San Joaquin rivers, and on the Southern P. R.R.; 30 miles northeast of San Francisco. It contains a United States arsenal and barracks; St. Augustine College (Roman Catholic); St. Catherine's Convent (Roman Catholic); extensive shipyards, and large agricultural, tanning, cement, and meat-packing plants. The city was once the capital of the State. Pop. (1900) 2,751.

Benicia Boy, a popular name for a once noted pugilist, John C. Heenan, whose home was in California. His fight with Sayers attracted wide-spread attention.

Benin, bē-nin', Africa, a negro country or kingdom, on the Bight of Benin, Gulf of Guinea, extending along the coast on both sides of the Benin River, and to some distance inland, but the limits are not accurately known. The capital is Benin, a town which at one time had some 15,000 inhabitants, but is now said to have greatly decreased in population. It is situated about 50 miles from the coast, and consists of clay-built houses neatly thatched with reeds, straw, or leaves. The coast, which now belongs to the British, is thickly indented with estuaries, some of them of considerable breadth and studded with islands. The country is flat for some distance inland, when it begins gradually to rise till it attains a height of over 2,000 feet. It is very well wooded, and being likewise well watered, it is rich in all the vegetable produc-

BENIN — BENJAMIN

tions of the tropics. Cotton is indigenous, and is woven into cloth by the women. Sugar-cane of good quality is grown; and yams, plantains, maize, rice, etc., are cultivated. The religion is Fetichism. The climate, especially at the mouths of the rivers, is very unhealthy. There is a considerable trade in palm oil and other products.

Benin, Bight of, Africa, a large bay on the west coast, forming a portion of the Gulf of Guinea, and extending from the Niger delta westward to about the river Volta.

Beniowsky, Moritz August von, bā-nē-ōff'-skī, mō'rītz ow'goost fōn, Hungarian adventurer: b. Verbova, Hungary, 1741; d. 23 May 1786. The son of an Austrian general, he served as lieutenant in the Seven Years' war and in the Polish war against Russia. In 1769 he fell into the hands of the Russians, who exiled him to Kamchatka. Availing himself of a knowledge of navigation, he succeeded in saving from wreck the vessel which was to convey him to Siberia. This feat won for him the sympathy of the governor of Kamchatka, which was still more strengthened by his proficiency in chess, and he appointed him tutor of his children. One of his pupils fell in love with him, and with her father's consent they were married. In 1771 he effected his escape from Kamchatka with the assistance of his wife, who, although she had since learned that he had another wife in Hungary, followed him to Formosa and Moscow, at which latter place she died. On his return to Paris he undertook to found a French colony at Madagascar, where he arrived in June 1774, founded his colony, and in 1775 was proclaimed king by some of the native tribes, while his wife was proclaimed queen. The governor of the Isle of France refusing to supply him with men to support his state, Beniowsky applied directly to the French government, but without success. Disgusted with the French and their colonies, he now entered the Austrian service, and was commander in the battle of Habelschwerdt, in 1778, against the Prussians. His subsequent efforts to interest the English government for Madagascar were fruitless, but with the support of a wealthy firm of Baltimore, U. S. A., he effected a landing in Madagascar, but was killed soon after in a conflict with troops from the Isle of France. He wrote his autobiography in French; it was translated into German by George Forster, into English by William Nicolson, and into various other languages. Kotzebue dramatized his character and career in his play entitled 'The Conspiracy in Kamchatka.'

Benish' Days, days (Mondays, Wednesdays, and Saturdays) on which the modern Egyptians don the *benish* (whence the name), or ordinary garment, relax their religious duties, and engage in pleasures.

Benjamin, the youngest son of Jacob and Rachel (Gen. xxxv. 16-18). Rachel died immediately after he was born, and with her last breath named him Ben-oni, "son of my sorrow"; but Jacob called him Benjamin, "son of my right hand." He was a great comfort to his father, who saw in him the image of the wife he had buried, and of Joseph, whose loss he also mourned. He could hardly be persuaded to let him go with his brethren to Egypt. The tribe of Benjamin, small at first, was almost exterminated in the days of the Judges, but

afterward it greatly increased. On the revolt of the 10 tribes Benjamin adhered to the camp of Judah; and the two tribes ever afterward closely united. King Saul and Saul of Tarsus were both Benjamites.

Benjamin, Charles Henry, American engineer: b. Patten, Me., 29 Aug. 1856. He graduated at the University of Maine, and was professor of mechanical engineering there, 1880-6. Since 1889 he has been professor of the same subject in the Case School of Applied Science, Cleveland, Ohio. Publications: 'Notes on Heat and Steam' (1894); 'Notes on Machine Design' (1895); 'Mechanical Laboratory Practice' (1898); 'Evolution of the Machine Tool' (1898); 'Power Losses in Machine-Shops' (1900); 'Development of Fly Wheels' (1900); and monographs in the 'Transactions' of the American Society of Mechanical Engineers, Vols. XVIII.-XXI.

Benjamin, Judah Philip, American lawyer: b. St. Croix, West Indies, 11 Aug. 1811; d. Paris, 7 May 1884; of English parentage and of Jewish faith. He was educated at Yale College; admitted to the bar in New Orleans in 1832; and elected to the United States Senate in 1852 and 1858. At the beginning of the Civil War he resigned from the Senate and declared his adhesion to the State of Louisiana. In 1861 he accepted the office of attorney-general in the Cabinet of Jefferson Davis, and afterward became successively Confederate secretary of war and secretary of state. After the war he went to London, England, where he was admitted to the bar in 1866. He gained a successful practice, and in 1872 was formally presented with a silk gown. He wrote a 'Treatise on the Law of Sale of Personal Property' (1868).

Benjamin, Marcus, American editor and compiler: b. San Francisco, 17 Jan. 1857. He graduated at Columbia School of Mines, 1878, and was chemist at the United States Appraiser's Store, New York, 1883-5. Since 1883 he has been a regular contributor to 'Appleton's Annual Cyclopædia' and the 'Cyclopædia of American Biography,' and edited a number of the Appleton guides and handbooks. He was on the editorial staff of the 'Standard Dictionary'; 'Encyclopædic Dictionary'; 'Johnson's Universal Cyclopædia'; and the 'International Year Book'; and has translated Bertholet's 'Explosive Materials' (1883). Since 1896 he has been connected with the United States National Museum.

Benjamin, Park, American journalist, poet, and lecturer: b. Demerara, British Guiana, 14 Aug. 1809; d. New York, 12 Sept. 1864. He studied law, but later took up literary work, helping to found 'The New World' in New York. His poems, of a high order of merit, have never been collected. 'The Contemplation of Nature,' read on taking his degree at Washington College, Hartford, 1829; the satires, 'Poetry' (1843); 'Infatuation' (1849); 'The Nautilus'; 'To One Beloved'; and 'The Old Sexton' are among his works. He was associated editorially with Epes Sargent and Rufus W. Griswold.

Benjamin, Park, American lawyer, editor, and miscellaneous writer, son of the preceding: b. New York, 11 May 1849. A graduate of the United States Naval Academy, (1867), he served on Admiral Farragut's flagship, but resigned in

BENJAMIN — BENNETT

1869. As a lawyer he has been a patent expert. He edited the 'Scientific American' (1872-8), and Appleton's 'Cyclopædia of Applied Mechanics'. He has written 'Shakings: Etchings from the Naval Academy' (1867); 'The Age of Electricity' (1886); 'The Intellectual Rise in Electricity, a History'; 'The United States Naval Academy' (1900); etc.

Benjamin, Samuel Green Wheeler, American traveler, artist, and miscellaneous writer: b. Argos, Greece, 13 Feb. 1837. He was educated at Williams College; was assistant librarian in the New York State Library, 1861-4; and was United States minister to Persia, 1883-5. Among his numerous works, both in prose and verse, are: 'Art in America'; 'Contemporary Art in Europe' (1877); 'Constantinople' (1860).

Benjamin, William Augustus, American journalist, poet, composer: b. 26 July 1865. His most prominent poems are: 'From Then Till Now' (1889); 'The Storm' (1889); 'Musings of Shadow-Silence' (1890); 'Twilight Fancies' and 'The Tide of Life' (1891); etc. Of his musical compositions, 'The Surge of the Sea' (1890); 'The Promise' (1894); and 'Go to Sleep' (1895).

Benjamin of Tudela, Jewish traveler: b. Tudela, Navarre, in the 12th century; is chiefly known by his travels over large portions of Europe, Palestine, Mesopotamia, the East Indies, and Ethiopia. As the first European traveler who penetrated far into the East, he furnishes a great amount of interesting information, and though not free from error or fable, proves himself worthy of the high estimation in which he has always been held among his Jewish countrymen for soundness of judgment and extent of learning. His 'Itinerary,' first printed in Hebrew at Constantinople in 1543, has been translated into many languages. The edition of Asher (London and Berlin 1840-1) contains an English translation.

Benjamin-Constant, Jean Joseph, böñ-zhāmāñ-kōñ-stōñ, zhōñ zhō-sēf, French painter: b. Paris, 10 June 1847; d. there, 26 May 1902. He studied under Cabanel, and exhibited in the salon of 1869, a scene from 'Hamlet'. His taste inclined him to Oriental subjects and the nude, and his vivid coloring and dramatic treatment made his work fashionable in Paris and London. His work displays much finished and minute detail, but he paid chief attention to harmony of effect and decorative value. Among his Oriental pictures are 'Mahomet II'; 'Les Chérifas'; 'Les Funérailles de l'Emir'; 'La Justice du Chérif.'

Benkulen. See BENCOOLEN.

Benndorf, Otto, German archæologist: b. 13 Sept. 1838. He studied at Erlangen and Bonn, went to Italy and Greece, 1864-8, for archæological work, and was professor of archæology at the universities of Göttingen, Zurich, Munich, Prague, and Vienna. In 1875 he made a second archæological tour to Samothrace; in 1881 and 1883 he made two expeditions, at state cost, to southwestern Asia Minor; in 1898 he was made director of the Austrian Archæological Institute. He wrote 'The Ancient Sculptures in the Lateran Museum' (in conjunction with Schöne) (Leipsic 1867); 'Ancient Historical Helmets and Sepulchral Masks' (1878); 'Travels in Southwest Asia Minor' (1884); etc.

Benne Oil, a valuable oil expressed from the seeds of *Sesamum orientale* and *S. indicum*, much cultivated in India, Egypt, etc., and used for purposes similar to those of olive oil. Also called sesamum oil and gingelly oil. See SESAME.

Bennet, Elizabeth, the heroine of Jane Austen's novel, 'Pride and Prejudice.' See Howells, 'Heroines of Fiction' (1901).

Bennet, Henry (EARL OF ARLINGTON), English statesman: b. Arlington, Middlesex, 1618; d. 28 July 1685. He was devoted to the cause of Charles I., and was appointed under-secretary of state; he fought in several battles, and was wounded at Andover, but after the battle of Worcester he retired to Spain. Upon the restoration he returned to England, and was appointed keeper of the privy seal, and shortly afterward secretary of state. In 1664 he was created Baron Arlington; in 1670 became noted as one of the famous Cabal, but is not accused of entertaining their extreme sentiments; he was created Earl of Arlington in 1672. He was one of the plenipotentiaries sent to Utrecht to negotiate a peace between Austria and France, but the mission not being successful, an endeavor was made by his colleagues to cast the odium of the failure upon him. He defended himself, however, before the House of Commons, and was acquitted. The war with Holland, which is said to have been caused by the machinations of the Cabal, lost to Arlington the favor of the king and people; but in spite of this he received the office of chamberlain. In 1679 he became a member of the new council, and retained his office of chamberlain on the accession of James II.

Bennett, Alfred Allen, American chemist: b. Milford, N. H., 30 Nov. 1850. He graduated at the University of Michigan 1877; became professor of chemistry and physics in Iowa Wesleyan University; and since 1885 has been professor of chemistry in Iowa State College. Publications: 'Text Book of Inorganic Chemistry,' 2 vols., and articles in the 'American Chemical Society Journal.'

Bennett, Charles Edwin, American educator: b. Providence, R. I., 6 April 1858. He graduated at Brown University 1878; pursued graduate studies at Harvard and in Germany 1881-4; was professor of Latin at the University of Wisconsin 1889-91; of classical philology at Brown 1891-2; and in the latter year was elected professor of Latin at Cornell. He has been a frequent contributor to classical journals and editor of classical texts. Publications: 'A Latin Grammar' (1895); 'The Foundations of Latin' (1898); 'Critique of Some Recent Subjunctive Theories' (1898); 'The Quantitative Reading of Latin Poetry' (1899); 'The Teaching of Greek and Latin in Secondary Schools' (1900). He has edited: 'Xenophon's Hellenica, Books V.-VIII.' (1892); 'Tacitus, Dialogus de Oratoribus' (1894); 'Cicero, De Senectute' (1897); and 'Cicero, De Amicitia' (1897).

Bennett, Charles Wesley, American Methodist clergyman and educator: b. East Bethany, N. Y., 18 July 1828; d. 17 April 1891. He was principal of Genesee Wesleyan Seminary (1869-71); professor of history and logic at Syracuse University (1871-85); professor of historical theology, Garrett Biblical Institute, Evanston, Ill.

BENNETT

(1885-91). He wrote 'National Education in Italy, France, Germany, England, and Wales' (1878); and 'Christian Art and Archæology of the First Six Centuries' (1888).

Bennett, Edmund Hatch, American lawyer: b. Manchester, Vt., 6 April 1824, d. 2 Jan. 1898. He was graduated at the University of Vermont in 1843, and admitted to the bar in 1847. He practised for many years in Taunton, Mass., and was mayor of that city 1865-7, and judge of probate and insolvency of Bristol County 1858-83. He was lecturer at Harvard Law School 1865-71, and afterward professor and dean at the Law School of Boston University. His works include 30 volumes of 'English Law and Equity Reports'; '9-12 Cushing's (Mass.) Reports'; 'Massachusetts Digest' (3 vols.); 'Bingham on Infancy'; 'Blackwell on Tax Titles'; 'Leading Criminal Cases' (2 vols.); 'Goddard on Easements'; 'Benjamin on Sales'; 'Pomeroy's Constitutional Law'; 'Indermaur's Principles of Common Law'; and 'Fire Insurance Cases' (5 vols.). He has also made frequent contributions to professional journals, and has been co-editor of the 'American Law Register.'

Bennett, Emerson, American novelist: b. Monson, Mass., 16 March 1822. He began to write at an early age and has published some 60 or more extremely sensational tales which have been popular with uncritical readers. Among them are 'Prairie Flower'; 'The Outlaw's Daughter'; and 'The Forged Will.'

Bennett, James Gordon, American journalist: b. Newmill, Keith, 1 Sept. 1795, d. 1 June 1872. Trained for the Roman Catholic priesthood, he emigrated to the United States in 1819, where he became in turn teacher, proof-reader, journalist, and lecturer. He had acted as casual reporter and writer in connection with several journals, and had failed in one or two journalistic ventures previous to the issue of the first number of the *New York Herald*, which he founded as an independent newspaper, 6 May 1835, price one cent. He spared no effort and expense in securing news, and laid the foundation of its subsequent enormous success. It was the first newspaper to publish the stock lists and a daily money article.

Bennett, James Gordon, American journalist, (son of the preceding): b. New York, 10 May 1841. He became managing editor of the *New York Herald* in 1866, and became its proprietor on the death of his father in 1872. In 1870 he sent Henry M. Stanley on the exploring expedition which resulted in the finding of Dr Livingstone, and, in conjunction with the *London Daily Telegraph*, supplied the means for his journey across Africa by way of the Congo in 1874-8. He organized a system of storm prognostications of value to shipping-masters; fitted out the Jeannette Polar expedition; and in 1883 was associated with John W. Mackay in organizing the new Commercial Cable Company. He founded the *Evening Telegram* in New York, and established daily editions of the *Herald* in Paris and London. He early gave much attention to yachting, in 1866 taking part in an ocean yacht race from Sandy Hook to the Needles, Isle of Wight, which was won by his schooner *Henrietta* against two competing yachts in 13 days, 21 hours, 55 minutes. In 1870 he raced in his yacht *Dauntless* from Queenstown to Sandy

Hook, but was beaten by the *Cambria* by two hours. He resides mainly in Paris, collecting foreign news, and directing by telegraph the management and policy of his newspapers. The *New York Herald* was incorporated in 1899.

Bennett, John, American writer: b. Chillicothe, Ohio, 17 May 1805. He has published 'Master Skylark' (1892); 'The Story of Barnaby Lee' (1900).

Bennett, John Hughes, English physician: b. London, 31 Aug. 1812, d. Norwich, 25 Sept. 1875. He graduated at Edinburgh in 1837, and after four years' study in Paris and Germany settled in Edinburgh as an extra-mural lecturer. A work published in 1841, in which he recommended cod-liver oil in all consumptive diseases, first brought him into notice, and in 1848 he was made professor of the institutes of medicine in Edinburgh University—a post which he held until 1874. His health gave way in 1871, and most of his last years were spent abroad.

Bennett, Joseph M., American philanthropist: b. Juliustown, N. J., 16 Aug. 1816, d. 29 Sept. 1898. He engaged in the clothing business in Philadelphia, Pa., when 16 years old. In 1880 he gave 40 acres of ground in what is now Fairmount Park, valued at \$400,000, for a Methodist Orphanage, to the support of which he afterward largely contributed. He also established the Hays Home, and gave valuable properties to the Deaf and Dumb Institute, the University of Pennsylvania, and the Methodist Deaconesses. His property was said to be worth \$3,000,000, and it is estimated that he gave \$1,000,000 to charity. He bequeathed \$500,000 to the University of Pennsylvania for its proposed college for women.

Bennett, Mary E. (ELIZABETH GLOVER), American writer: b. Connecticut, 1841; a writer of New Haven, Conn., whose writings have been published over the pen name ELIZABETH GLOVER. They include 'Cyril Rivers'; 'Six Boys'; 'Asaph's Ten Thousand'; 'Talks About a Fine Art'; 'Family Manners'; 'The Children's Wing'; 'Jefferson Wildrider'; 'The Gentle Art of Pleasing'.

Bennett, Samuel Crocker, American lawyer: b. Taunton, Mass., 19 April 1858. He is a son of Edmund Hatch Bennett (q.v.), and in 1898 succeeded his father as dean of the law school of Boston University. He is one of the editors of 'Federal Decisions'; 'Smith's Leading Cases'; 'Benjamin on Sales'; 'Cyclopedia of Law and Procedure'.

Bennett, Sanford Fillmore, American hymnologist: b. Eden, N. Y., 1836; d. 12 June 1898. He settled in Elkhorn, Wis., in 1860, and became editor of the *Independent*. Resigning this place, he entered the 40th Wisconsin Volunteers and served with them throughout the Civil War. In 1867 he aided J. P. Webster, the composer, in preparing 'The Signet Ring,' a Sunday-school hymn-book, to which he contributed about 100 hymns. 'The Sweet Bye and Bye' was one of the first of these. Many of Mr. Bennett's hymns and songs have been published in sheets.

Bennett, William Cox, English songwriter: b. Greenwich, 14 Oct. 1820; d. Blackheath, 4 March 1895. He suggested that the bust of Longfellow be placed in Westminster Abbey, and formed a committee of 500, with the Prince of Wales at its head, to effect it. He

BENNETT — BENOIT

was the author of 'Poems' (1850); 'The Trial for Salamis' (1850); 'Endowed Parish Schools and High Church Vicars' (1853); 'Queen Eleanor's Vengeance, and Other Poems' (1856); 'War Songs' (1857); 'Songs by a Song-Writer' (1858); 'Baby May, and Other Poems' (1859); 'Our Glory Roll, and Other National Poems' (1867); 'Contributions to a Ballad History of England, etc.' (1869); 'School-Book of Poetry' (1870); 'Songs for Sailors' (1872); 'Narrative Poems and Ballads' (1879); 'Songs of a Song-Writer' (1876); and 'Sea Songs' (1878).

Bennett, Sir William Sterndale, English composer. b. Sheffield, 13 April 1816; d. London, 1 Feb. 1875. He became a pupil of the Royal Academy of Music in 1825, studying under Cipriani Potter, Crotch, and Lucas, and afterward Moscheles. By the advice of Mendelssohn, whose friendship he had gained, he studied in Leipsic from 1836 to 1838, and his performances and compositions were held in high esteem by the younger German musicians, and especially by Schumann. After a period spent in teaching, conducting, and composing, he was appointed professor of music at Cambridge in 1856, and was knighted in 1871. In 1868 he became principal of the Royal Academy of Music. He was too entirely dominated by Mendelssohn's influence to do great original work. He is best known by his overtures, 'The Naiads' and 'Parnassus'; his cantatas, 'The May Queen' and 'Woman of Samaria'; and his little musical sketches, 'Lake,' 'Millstream,' and 'Fountain.'

Bennett Law, The, a law passed by the legislature of Wisconsin in 1889, which provided that all instruction in the public schools should be given in the English language. After two years of agitation it was repealed.

Bennigsen, Rudolph von, German statesman. b. Luneberg, Hanover, 1825; d. Bennigsen, 7 Aug. 1902. After Hanover became a part of Prussia he was elected to the North German Diet and the Prussian Assembly, becoming vice-president of both. Entering the German Reichstag in 1871, he became prominent as leader of the National Liberals, warmly supporting Bismarck for years, but later opposing his policy toward the Socialists. After some years spent in retirement, Bennigsen re-entered politics in 1887 and continued active until 1898, when he resigned his position as president of the province of Hanover.

Benningsen, Levin Augustus (Baron Von), Russian soldier: b. Brunswick, 1745, d. 3 Oct. 1826. He entered the Russian service at an early age, and distinguished himself by his bravery in the war against Poland, under the Empress Catherine II. In 1806 he was appointed to command the Russian army which went to the assistance of the Prussians. He afterward fought the battles of Eylau and Friedland. After the Peace of Tilsit he retired to his estates. In 1813 he led the Army of Poland into Saxony, took part in the battle of Leipsic, and blockaded Hamburg. He was commander-in-chief in southern Russia, but finally settled in his native country, where he died.

Bennington, Vt., town and county-seat of Bennington County, on the Bennington & R. and the Lebanon Springs R.R.'s; 36 miles east of Troy, N. Y., and 55 miles southwest of Rut-

land. It contains the villages of Bennington, North Bennington, and Bennington Centre; and has large woolen and knit-goods factories; a Soldiers' Home, a memorial battle monument, dedicated on the centennial of the admission of the State into the Union, 19 Aug. 1891; two national banks, public library, numerous churches, and graded public schools. There are valuable deposits of brown hematite ore in the town. Pop. (1900) 8,033.

Bennington, Battle of, one of the early battles of the Revolution, fought at Bennington, Vt., 16 Aug. 1777. The army of Gen. Burgoyne, marching to the south from Canada, and causing the abandonment of Ticonderoga by Gen. St. Clair, created the greatest commotion throughout New England, since Boston was supposed to be its point of destination. Gen. Stark chanced to be at the time at Bennington, having under his command a corps of New Hampshire militia, and he determined to confront a strong detachment of the enemy sent out under Col. Baum to procure supplies. He hastily collected the continental forces in the neighborhood, and on 16 August approached the British colonel, whom, after a hot action of two hours, he forced to a disorderly retreat. The engagement was hardly over when a re-enforcement arrived, sent by Gen. Burgoyne, and the battle was renewed, and kept up several hours till dark, when the British forces retreated, leaving their baggage and ammunition. The loss of the enemy was 207 killed, 600 taken prisoners, and 1,000 stand of arms. The Americans lost only 14 killed and 42 wounded.

Benno, St., German ecclesiastic (son of the Count of Woldenberg): b. Hildesheim, 1010; d. 1107. At 18 years of age he became a monk in the Benedictine convent of St. Michael in his native town. Henry IV. (1066) made him Bishop of Meissen, and favored him by repeated donations of estates for his church. Nevertheless Benno took a secret part in the conspiracy of the Saxon nobles against the emperor, for which reason Henry led him away prisoner when he passed Meissen in 1075 after the battle on the Unstrut. In the contest between Henry and Gregory VII. he vigorously defended the Pope's cause. Miraculous powers being attributed to his bones, Pope Adrian VI., after many entreaties from the Saxons, as well as from the Emperor Charles V., placed him among the saints. His relics are in the city of Munich, which has chosen him for its patron.

Bennozo, Gozzoli, Italian painter: b. 1400. He became the pupil of Giovanni di Fiesole and the imitator of Musaccio, and soon placed himself at the head of all his contemporaries. He excelled particularly in the representation of splendid edifices, landscapes, animals, and scenes of animation and gaiety. After visiting Rome he settled at Pisa, where his finest pieces are seen. The most celebrated, 'The Discussion with the Doctors,' is one of the principal ornaments of the cathedral.

Benoit, Pierre Leopold Leonard, bē-nwā, pē-ār lā-ō-pōld lā-ō-nār, Flemish musician and composer: b. Harelbeke, Belgium, 17 Aug. 1834. He studied under Fétis. He has held the position of director of the Flemish School of Music in Antwerp since 1867, and has written a number of oratorios, cantatas, and operas. In

BENOIT — BENT

the first class of these compositions, his 'Lucifer,' 'The Drama of Christ,' and 'The War,' should be mentioned.

Benoit de Sainte-Maure, *dé saint-môr*, French trouvère and chronicler: b. Touraine; fl. in the 12th century. He wrote in about 42,300 octosyllabic verses a 'Chronicle of the Dukes of Normandy' to the year 1135. To him is usually ascribed the 'Romance of Troy,' founded on the story of the siege of Troy as written by Dictys Cretensis and Dares; it was translated into the languages of western Europe. Boccaccio, Chaucer, and Shakespeare would seem to be indebted to Benoit for the story of the loves of Troilus and Briseis (Cryseyde or Cressida being originally called Briseida).

Bensel, James Berry, American poet and novelist: b. New York, 2 Aug. 1856; d. 3 Feb. 1886. He lived most of his life at Lynn, Mass., and was a contributor to magazines. He wrote 'King Kophetua's Wife' (1884), a novel; 'In the King's Garden, and Other Poems' (1886).

Benserade, Isaac de, *ban-s'rad, ê-sak dê*, French poet: b. Lyons-la-Farêt, Normandy, 1612; d. Gentilly, 1691. He wrote for the stage, and composed a great number of ingenious verses for the king and many distinguished persons at court. In the first half of the reign of Louis XIV. the court and its followers patronized songs of gallantry, rondeaux, triolets, madrigals, and sonnets, containing sallies of wit, conceits, and effusions of gallantry in the affected style then prevalent. No one succeeded so well in this art as Benserade, who was therefore, by way of eminence, called *le poète de la cour*. He received many pensions for his performances and lived at great expense. Wearied at last with the life he led he retired to his country-seat, Gentilly.

Bensley, Thomas, English printer: d. 1833. He is much known for an edition of 'Lavater,' printed by him in 1789, in 5 volumes quarto, and for an edition of the English Bible between 1800 and 1815, in 7 volumes quarto. He also printed Shakespeare in 1803, in 7 volumes octavo, and in 1806 Hume's 'England' in 10 volumes folio, which is adorned with elaborate portraits and engravings on copper. He was prominent also in the construction of the machine printing-press invented by Koenig and applied to printing the *Times* newspaper in 1814.

Benson, Arthur Christopher, English author: (son of Edward White Benson, and brother of Edward Frederic, qq.v.) b. 24 April 1862. He was educated at Eton and Cambridge. In 1885 he was appointed master of Eton College. He is the author of several volumes of poems, published in 1893, 1895, 1896, and 1900; and also of 'Memoirs of Arthur Hamilton' (1886); 'Archbishop Laud' (1887); 'Men of Might' (with Mr. Tatham); 'Fasti Etonenses' (1899); 'Life of Archbishop Benson' (1899); 'The Schoolmaster' (1902); and 'Tennyson' (in the 'Little Biographies' Series).

Benson, Carl, pseudonym of Charles Astor Bristed (q.v.).

Benson, Edward Frederic, English author: (son of Edward White Benson and brother of Arthur Christopher qq.v.) b. Wellington College, 24 July 1867. He was educated at King's College, Cambridge; worked at Athens for the British Archaeological School (1892-5), and in

Egypt, for the Hellenic Society (1895); traveled in Algiers, Egypt, Greece, and Italy. His writings include 'Dodo' (1893), a novel of London society; 'Rubicon' (1894); 'Judgment Books' (1895); 'Limitations' (1896); 'The Babe' (1897); 'Vintage' (1898); 'The Cap-sina' (1899); etc.

Benson, Edward White, Archbishop of Canterbury. b. near Birmingham, 1829; d. Hawarden, 11 Oct. 1896. He graduated at Cambridge in 1852 as a first-class and senior optime, and was for some time a master at Rugby. He held the headmastership of Wellington College from its opening in 1858 to 1872, when he was made a canon and chancellor of Lincoln Cathedral. In 1875 he was appointed chaplain in ordinary to the queen, and in December 1876 was nominated to the newly erected bishopric of Truro. Here he began the building of a cathedral (1880-7), most of the first cost, £110,000, having been gathered by his own energy. In 1882 he was translated to Canterbury to succeed Dr. Tait as primate of all England. A high-churchman, Dr. Benson was frequently select preacher at both universities, and published several volumes of sermons, a small work on 'Cathedrals,' and a valuable article on 'St. Cyprian.' A distinguished ecclesiastical lawyer and diplomatist, he gave the important judgment in the Lincoln case on ritual.

Benson, Egbert, American jurist and politician: b. New York, 21 June 1746; d. Jamaica, N. Y., 24 Aug. 1833. He was graduated at Columbia College 1765; was member of Congress 1784-8, 1789-93, and 1813-15; judge of the supreme court of New York 1794-1801; and became a judge of the United States circuit court. He wrote a 'Vindication of the Captors of Major André,' and 'Mémorial on Dutch Names of Places.'

Benson, Eugene, American artist and miscellaneous writer: b. Hyde Park, N. Y., 1840. Residing in Rome, Italy, he has contributed to American magazines. He has written 'Gaspara Stampa' (1881), a biography, with selections from her sonnets; 'Art and Nature in Italy' (1882).

Benson, Frank Weston, American painter: b. Salem, Mass., 24 March 1862. He was educated at the Museum of Fine Arts, Boston, and in Paris; became a member of the Society of American Artists in 1888. He won the Hallgarten and the Clarke prizes at the National Academy of Design in 1889 and 1891; has done much in figure work with outdoor effects, but is best known for his portraits.

Bent, James Theodore, English traveler: b. Liverpool, 30 March 1852; d. London, 6 May 1897. He graduated at Oxford University in 1875, and managed excavations in Greece for the British Museums and the Hellenic Society. His publications include: 'A Freak of Freedom, or the Republic of San Marino' (1870); 'Genoa: How the Republic Rose and Fell' (1880); 'Life of Giuseppe Garibaldi' (1881); 'The Cyclades, or Life Among the Insular Greeks' (1885).

Bent, Silas, American naval officer: b. St. Louis, 10 Oct. 1820; d. 1889. He entered the navy in 1836; served in the Seminole war, and was with Commodore Glynn and Commodore Perry on several cruises to Japan. He was always especially active in survey work; on

BENT-GRASS—BENTHOS

Perry's Japan expedition he had charge of the hydrographic survey, and his excellent work became the basis of the surveys undertaken later by the Japanese government. His most important work was to delineate and describe scientifically the Kuro Shiwo, or Black Tide, the great northward-flowing stream of the Pacific, corresponding to the Atlantic Gulf Stream.

Bent-grass (*Agrostis*), a genus of grasses usually regarded as weeds except in soils which cannot produce better. Common bent-grass or purple bent (*A. vulgaris*) is a fine-leaved species with trailing stems rooting at the joints, and small thin panicles of purplish satiny flowers. It overruns dry, gravelly, sandy places with its wiry stems, and becomes a troublesome weed, only to be got rid of by pulling up early in the season before the seed is ripe, or by frequent harrowing. It is, however, sometimes sown in warrens and in places where nothing better will grow. March bent, white bent, or fiorin grass (*A. stolonifera*), has broader leaves than common bent, a much closer and larger panicle, and green or pale flowers. It is very common in low, damp places, which it overruns with its compact, trailing, rooting stems, and is a useful grass in newly reclaimed bogs or land liable to inundation. Brown bent-grass (*A. canina*) is known in the United States as Rhode Island bent-grass, and is highly prized as a lawn grass. Herd-grass (*A. cornucopia* or *dispar*) has large panicles of green flowers, which form an almost level top.

Bentang. See ERIODENDRON.

Benteen, Frederick William, American soldier: b. Petersburg, Va., 24 Aug. 1834; d. 22 June 1898. He was educated in his native state; and at the outbreak of the Civil War went to Missouri and organized a company of Union volunteers. He became first lieutenant of the 10th Missouri Cavalry, 1 Sept. 1861; promoted captain, 1 Oct. 1861; major, 18 Dec. 1862; lieutenant-colonel, 27 Feb. 1864; and colonel of the 138th United States Colored Infantry, 15 July 1865; mustered out of volunteer service 6 Jan. 1866. On 28 July 1866 he was commissioned captain in the 7th cavalry; promoted major of the 9th cavalry, 17 Dec. 1882; and retired 7 July 1888. His most brilliant service after the war was in his campaigns against the Indians.

Benthall Fauna, the abyssal or deep-sea fauna; the great assemblage of animals living at all depths below 150 fathoms in the North Atlantic, to 500 fathoms in the tropics. See also DEEP-SEA LIFE.

Bentham, George, English botanist; nephew of Jeremy Bentham (q.v.): b. near Plymouth, 22 Sept. 1800; d. 10 Sept. 1884. He was privately educated, early attached himself to botany, and having resided in southern France (where his father had an estate), 1814-26, he published in French (1826) a work on 'The Plants of the Pyrénées and Lower Languedoc.' Having returned to England he studied law, and on this subject, as well as logic, he developed original views. Finally, however, he devoted himself almost entirely to botany; was long connected with the Horticultural Society and the Linnæan Society; and from 1861 onward was in almost daily attendance at Kew (except for a few weeks occasionally), working at descriptive botany from 10 to 4 o'clock as a labor of love. Along with Sir J. D. Hooker

he produced the great work of descriptive botany, 'Genera Plantarum'; another great work of his was the 'Flora Australiensis' (in 7 volumes). His 'Handbook of the British Flora' is well known.

Ben'tham, Jeremy, English jurist and publicist: b. London, 15 Feb. 1748; d. London, 6 June 1832. After an early education at Westminster School he went to Oxford in his 13th year, taking his bachelor's degree at 15, and his master's degree at 18. He studied English law, but never appeared at the bar, being enabled by easy circumstances to devote himself entirely to literary compositions. He did not, however, publish his chief works himself. They were arranged and translated into French by his friend, Etienne Dumont, and printed partly in Paris and partly in London. Among them are: 'Treatises on Civil and Penal Legislation' (Paris 1802, 3 vols.), and 'Theory of Punishments and Rewards' (London 1801, 2 vols.). Bentham advocated a thorough correction of civil and criminal legislation. His 'Fragments on Government,' in opposition to Blackstone, appeared anonymously in 1776, and with his name, London 1823. In France his literary labors found a better reception than in England or Germany. A small pamphlet on the liberty of the press (London 1821) was addressed by him to the Spanish Cortes during their discussion of this subject; and in another ('Three Tracts Relative to the Spanish and Portuguese Affairs,' London 1821) he refuted the idea of the necessity of a house of peers in Spain, as well as Montesquieu's proposition that judicial forms are the defense of innocence. One of his latest works was the 'Art of Packing' (London 1821), that is, of arranging juries so as to obtain any verdict desired. His previous work, 'Essay on Parliamentary Practice,' edited from the author's papers by Dumont (Geneva 1815), and translated into German, contains many useful observations. His 'Introduction to the Principles of Morals and Legislation' (London 1823, 2 vols.) treats of the principal objects of government in a profound and comprehensive manner. Zanolli has translated Bentham's 'Theory of Legal Evidence' into Italian (Bergamo 1824, 2 vols.). Among the earlier works of Bentham was his 'Defense of Usury,' showing the Impolicy of the Present Legal Restraints on the Terms of Pecuniary Bargains' (1787). At his death Mr. Bentham bequeathed his body to be dissected for the benefit of science. A complete edition of his works, with a biography by Bowring, was published in London (11 vols. 1843). He was a man of primitive manners, unblemished character, and undoubted earnestness in the cause of the people at large. He is considered the father of the Utilitarians, or those moral political economists who view everything as it is affected by the principle of "the greatest happiness of the greatest number."

Benthos, the constantly or periodically submerged vegetation attached to the bottoms of seas and, to some extent, of lakes, distinguished from the floating vegetation. (See PLANKTON.) Commencing at the high-tide line and progressing toward the low-tide line the vegetation gradually becomes more abundant and luxuriant, but reaches its maximum below the low-tide mark in areas wholly submerged, in which at medium depths individual development is

BENTINCK — BENTLEY

greater than at greater depths. The benthos of the frigid zones are the most remarkable of the world. The leading plants of such formations are green, red, and brown algæ, eel-grass, and rockweed.

Bentinck, Lord William Charles Cavendish, English soldier and statesman (second son of the third Duke of Portland): b. 14 Sept. 1774; d. Paris, 17 June 1839. He entered the army at an early age, and served in the Duke of York's campaign in Flanders, and also in Italy with the Russian army under Suwaroff, 1799-1801. In 1803 he proceeded to India as governor of Madras, returned thence in 1805, and subsequently went to Spain, where he commanded a brigade under Sir John Moore at Corunna. In 1810 he visited Sicily as British plenipotentiary, and commander-in-chief of the English troops. The most noticeable feature of this expedition is his bestowment on the Sicilians of a constitution, which, however, was overturned on the restoration of the Bourbons. He conducted in 1813 the expedition from Sicily to Catalonia, and in 1814 took possession of Genoa on the revolt of the inhabitants from French rule. The same year he returned to England, and subsequently entered Parliament as member for Nottingham. In 1827, under Mr. Canning's administration, he was sent to India as governor-general, and held that office till 1835, when he returned to England. Among the principal events of his administration are the abolition of the practice of suttee, the repeal of the restrictions which prohibited all Europeans, except servants of the company, from settling in India, and the recognition of the liberty of the press. In 1836 he again entered Parliament as member for the city of Glasgow, but was now unable from ill health to take any active share in political matters.

Bentinck, Lord William George Frederick Cavendish, generally known as **LORD GEORGE BENTINCK**, English statesman (son of William Henry Cavendish, fourth Duke of Portland): b. 27 Feb. 1802; d. 21 Sept. 1848. He entered the army, but quitted it early to become private secretary to Mr. Canning, who had married his mother's sister. In 1827 he entered Parliament as member for King's Lynn, and continued to represent that borough for the rest of his life. Up to 1846 he was a warm adherent of Sir Robert Peel and his measures; but on the latter announcing himself in that year a convert to free-trade principles, Lord George abandoned his old ally and came forward as the zealous and indefatigable leader of the Protectionists in the House of Commons. With the assistance of Disraeli he maintained this position for two years, and though often illogical, and sometimes unscrupulous in his statements, he nevertheless commanded much attention by the vigor and earnestness of his oratory and deportment.

Bentivoglio, Cornelio, bën-tê-vôl'yô, cornâl'yô, Italian ecclesiastic and poet: b. Ferrara, 1668; d. Rome, 1732. He early distinguished himself by his progress in the fine arts, literature, philosophy, theology, and jurisprudence, and was a patron of the literary institutions at Ferrara. Pope Clement XI. made him his domestic prelate and secretary to the apostolic chamber, and sent him, in 1712, as nuncio to Paris, where, during the last years of the reign of Louis XIV., he acted an important part in

the affair of the bull *Unigenitus*. The Duke of Orleans, regent after the death of Louis, was not favorably disposed toward him; the Pope therefore transferred him to Ferrara, and in 1719 bestowed on him the hat of a cardinal, and employed him at first in Rome, near his own person, then as legate *a latere* in Romagna, etc. Poetry had occupied his leisure hours. Sonnets composed by him may be found in Gobbi's Collection, Vol. III, and in other collections of his time. Under the name of **SELVAGGIO PORPORA** he translated the 'Thebais of Statius' into Italian.

Bentivoglio, Guy or Guido, gē'dô, Italian historian and ecclesiastic: b. Ferrara, 1579, d. Rome, 1644. He studied at Padua with great reputation, and afterward, fixing his residence at Rome, acquired general esteem by his prudence and integrity. He was an able politician, and his historical memoirs are valuable, especially his 'History of the Civil Wars in Flanders,' written in Italian, and first published at Cologne (1630), a translation of which, by Henry, Earl of Monmouth, appeared in 1654 (London, folio). His own 'Memoirs' and a collection of letters are reckoned among the best specimens of epistolary writing in the Italian language (an edition of which was published at Cambridge in 1727).

Bentley, Charles Eugene, American clergyman: b. Warner's, N. Y., 30 April 1841. He was educated at Monroe Institute and Oneida Seminary. In 1866 he removed to Iowa and in 1878 to Butler County, Neb., where he resided until 1890. He was ordained a Baptist clergyman in 1880 and was in charge of a church at Surprise, Neb. In 1884, he was chairman of the Nebraska Prohibition Convention, and became the unsuccessful candidate for congress, governor, and United States Senator during the next eight years. When the Prohibition party divided in 1896, he became presidential candidate of the faction known as the Liberty Party (q.v.).

Bentley, Gideon, American soldier: b. 1751; d. Constantia, Oswego County, N. Y., January 1858. He was remarkable for his longevity (107 years), and for the excellent though humble services which he rendered as a private soldier in the Revolutionary War.

Bentley, John Francis, distinguished English architect: b. Doncaster, England, 1839; d. Clapham, London, 2 March 1902. Upon the rebuilding of the great parish church in Doncaster, about 1856, Bentley was placed in the office of the clerk of the works, his architectural education practically beginning at this time. In 1862 he began practice as an architect on his own account, and his patrons from that date onward were mainly Roman Catholics. Among his lesser works are the Roman Catholic church and convent at Bocking, Essex; and the new Roman Catholic cathedral in Brooklyn, N. Y.; but the building with which his name will be inseparably associated is the Roman Catholic cathedral at Westminster, a structure of vast proportions with a nave wider than that of any church in England. Bentley left nothing in the way of design to subordinates, but designed and directed everything from the foundation to the minutest decorative feature. Bentley's death took place just as the Royal Institute of British Architects had voted to award him the royal gold medal.

BENTLEY — BENTON

Bentley, Richard, English divine, classical scholar, and polemicist. b. near Wakefield, Yorkshire, 1662; d. Cambridge, 14 July 1742. His father is said to have been a blacksmith. To his mother, a woman of strong natural abilities, he was indebted for the rudiments of his education, and in 1776 he entered Saint John's College, Cambridge. In 1682 he left the university, and became usher of a school at Spalding; a year later he took the position of tutor to the son of Dr. Stillingfleet, dean of St. Paul's. He accompanied his pupil to Oxford, where he availed himself of the literary treasures of the Bodleian Library in the prosecution of his studies. In 1684 he took the degree of A.M. at Cambridge, and in 1689 obtained the same honor at the sister university. His first published work was a Latin epistle to Dr. John Mill on an edition of the 'Chronicle of John Malela,' which appeared in 1691. It displayed so much profound learning and critical acumen as to excite the sanguine anticipations of classical scholars from the future labors of the author. Dr. Stillingfleet, having been raised to the bishopric of Worcester, made Bentley his chaplain, and in 1692 collated him to a prebend in his cathedral. He was chosen the first preacher of the lecture instituted by the celebrated Robert Boyle for the defense of Christianity. The discourses against atheism which he delivered on this occasion were published in 1694; they have since been often reprinted, and translated into several foreign languages.

In 1693 he was appointed keeper of the Royal Library at Saint James'—a circumstance which incidentally led to his famous controversy with the Hon. Charles Boyle, afterward Earl of Orrery, relative to the genuineness of the 'Greek Epistles of Phalaris.' In this dispute Bentley was victorious, though opposed by the greatest wits and critics of the age, including Pope, Swift, Garth, Atterbury, Aldrich, Dodwell, and Conyers Middleton, who advocated the opinion of Boyle with an extraordinary degree of warmth and illiberality. In 1699 Bentley, who had three years before been created D.D., published his 'Dissertation on the Epistles of Phalaris,' in which he proved that they were not the compositions of the tyrant of Agrigentum, who lived more than five centuries before the Christian era, but were written by some sophist under the borrowed name of Phalaris, in the declining age of Greek literature.

Soon after this publication Dr. Bentley was presented by the Crown to the mastership of Trinity College, Cambridge, worth nearly £1,000 a year. He now resigned the prebend of Worcester, and in 1701 was collated to the archdeaconry of Ely. His conduct as head of the college gave rise to accusations of various offenses, including embezzlement of college money. The contest, lasting more than 20 years, was decided against him, a sentence, depriving him of his mastership, being passed; but Bentley's superior skill and mastery of legal forms constantly baffled all attempts to oust him. In 1711 he published a quarto edition of Horace at Cambridge, which was reprinted at Amsterdam; and in 1713 appeared his remarks on 'Collins' Discourse on Free-Thinking,' under the form of a 'Letter to F. H. (Francis Hare), D.D., by Phileleutherus Lipsiensis.' He was appointed regius professor of divinity in 1716, and in the same year issued proposals for

a new edition of the Greek Testament, an undertaking for which he was admirably qualified, but which he was prevented from executing in consequence of the animadversions of his determined adversary, Middleton. In 1726 he published an edition of Terence and Phædrus; and his notes on the comedies of the former involved him in a dispute with Bishop Hare on the metres of Terence. The last work of Dr. Bentley was an edition of Milton's 'Paradise Lost,' with conjectural emendations, which appeared in 1732, but this proved a failure. He died at the master's lodge at Trinity, and was interred in the college chapel. The German scholar, J. A. Wolf, wrote an excellent biography of Bentley; and an English biography of him was written by Monk (London, 2 vols. 1833). See also Prof. Jebb's monograph in the 'English Men of Letters Series' (1882).

Bentley, William, American clergyman b. Boston, 1758; d. 29 Dec. 1819. He graduated at Harvard College in 1777, and was ordained pastor of a church in Salem in 1783. He was distinguished for his antiquarian learning, and collected a valuable and curious library and cabinet, which he bequeathed to the college at Meadville, Pa., and to the Antiquarian Society at Worcester. In theology he was regarded as a Unitarian, and he left several published sermons and discourses.

Benton, Angelo Ames, American clergyman b. Canaan, Crete, 1837. He graduated at Trinity College, Hartford, Conn., 1856, and at the General Theological Seminary, New York city. He was ordained in the Episcopal ministry in 1860. He was professor of Latin and Greek in Delaware College, Newark, Del., 1883-7, and professor of dogmatic theology in the University of the South, 1887-94. His chief publication has been 'The Church Cyclopædia: A Dictionary of Church Doctrine' (Phila. 1884).

Benton, Dwight, an American artist, writer and botanist b. Norwich, N. Y., 1834; d. Rome, 8 May 1903. After close of the Civil War, in which he fought on the Northern side, he established himself in Cincinnati as a landscape painter. From there he went to Rome where he lived 25 years almost uninterruptedly. In 1895 Hawaii, before its annexation, appointed him its Consul-General to Italy. His most famous canvases are 'Tombs of Keats and Shelly,' 'Sunset in the Roman Campagna,' and 'A Gloomy Day' (*giornata di Tristezza*), owned by the King of Italy. His work, 'Flora of the Roman Campagna and Palatine' is his most important contribution to literature.

Benton, James Gilchrist, American soldier and inventor: b. Lebanon, N. H., 15 Sept. 1820; d. Springfield, Mass., 23 Aug. 1881. He graduated at West Point in 1842, and served in the ordnance department throughout his life. He was in command of the Washington Arsenal and principal assistant to the chief of ordnance during the Civil War, at the close of which he was transferred to the Springfield (Mass.) Arsenal. For signal bravery in rescuing exposed ammunition from fire, he was twice brevetted. The various models of the Springfield rifle, known as the models of 1866, 1868, 1873, and 1879, were made under his direction. He devoted himself especially to the improvement of firearms, and acquired distinction for his valuable inventions in this and other lines of his work. He refused to patent any of them, as he held that since the

BENTON—BENTON HARBOR

government had educated him it had every right to benefit from his time and talents. He published 'Course of Instruction in Ordnance and Gunnery for the United States Military Academy' (1861; 4th ed. 1875).

Benton, Thomas Hart, American statesman: b. Orange County, N. C., 14 March 1782; d. 10 April 1858. He was the greatest of that most valuable and scarcely appreciated class, the Border State leaders, whose sympathies were with the South, and who had no feeling against slavery, yet at the cost of their influence and much personal peril opposed the political aggressions of slavery and the doctrines of disunion. Early orphaned, the eldest of a large family, after part of a course in the University of Pennsylvania he went with his mother to Tennessee as a pioneer, settling at the present Benton-town. A few years later he took up the study of law, and was admitted to the bar in 1811 under the patronage of his friend Andrew Jackson, then a judge of the Supreme Court. Elected to the legislature, he pushed through a judiciary reform bill, and one to give slaves the right of jury trial. In the War of 1812 he was aide-de-camp to Jackson, raised a volunteer regiment, was made lieutenant-colonel in the regular army, but saw no active service; meanwhile, 4 Sept. 1813, a misunderstanding over a duel of his brother's led to an affray in which the brother was stabbed, Jackson shot, and Thomas H. thrown downstairs, and the former friends were at bitter feud for many years. In 1815 he removed to St. Louis, practised law, and established a newspaper, which involved him in duels (one of which cost his opponent's life, to Benton's lasting regret); but which he used so vigorously to advocate Missouri's admission to the Union as a slave State that she elected him one of her senators on her entrance in 1820, and re-elected him every term for 30 years. During this time he stood as one of the foremost public men of his generation—a speaker of great ability and mastery of facts, a hard-headed logician and tremendous debater, of astonishing memory, unwearied industry, an iron will and physique, and a power of wit, sarcasm, and denunciation that made most men shrink from a contest with him. Being the spokesman of the Western Democrats, his policy and political feelings were coincident with Jackson's, their personal quarrel was at last arranged, and Benton became Jackson's first lieutenant and admiring champion. In every regard he supported Western interests: he secured the passage of laws for pre-emption, donation, and graded prices of lands, for throwing open the government mineral and saline lands to occupancy, and for repeal of the salt tax; advocated transcontinental exploration and post-roads, a Pacific railroad, occupation of the mouth of the Columbia, trade with New Mexico, military stations through the Southwest, amicable relations with Indian tribes, and everything conducive to opening up the West and making it prosperous. This made him invincible there till the slavery question drove him into opposition. He supported Jackson in his refusal to re-charter the United States Bank; and made a series of speeches urging the adoption of a metallic currency only, which were widely circulated, gained him the nickname of 'Old Bullion,' and had much to do with the creation of the sub-treasury scheme. When Jackson removed the secretary of the treasury,

Duane, for refusing to check out the deposits in the bank, the Senate adopted a resolution censuring him for it; Benton set about having the resolution expunged from the records, and after a protracted struggle succeeded, despite the logical absurdity of his motion, in accomplishing his purpose by a series of fervid panegyrics on Jackson. In the Nullification contest, Benton was Calhoun's chief opponent, not only as Jackson's supporter, but by conviction; and the two men of might—the chiefs of the State-Rights and Nationalist wings of the Democracy—remained deadly foes until Calhoun's death. In the Oregon boundary dispute Benton opposed the "fifty-four forty or fight" war-cry; it was dropped, but the Polk administration was glad of an excuse to drop it in order to push the Mexican war, and had no notion of diminishing the area of slavery to enlarge that of freedom. He favored the vigorous prosecution of the war, and came near being made commander-in-chief, from his close acquaintance with the territory. But from this time on, the slavery problem swallowed up every other. Benton fought Calhoun's State-Rights resolutions in retort to the Wilmot Proviso (q v), and they never came to a vote, but Calhoun sent them to various State legislatures to adopt and utilize for instructing their senators, and they were pushed through the Missouri legislature without Benton's knowledge. He denounced them as misrepresenting the people, canvassed his State for re-election in a long-famous series of powerful and caustic speeches, and carried his party, but was defeated by a fusion of Whigs and anti-Benton Democrats, and his senatorial service ended with 1850. He opposed the Clay compromise resolutions of that year, however (see COMPROMISE of 1850), with sarcasm still quoted. In 1852 he canvassed Missouri for election to the lower House, and was triumphantly returned. He supported Pierce for election, and in Congress till the Kansas-Nebraska bill came up. Against that he made one of his greatest speeches, and the administration thereupon ousted all his Missouri supporters, and he was defeated for re-election by the now dominant ultra-Southern sentiment in the Democratic party. The time of mediators and middle courses had gone by. He now set about writing his remarkable 'Thirty Years' View' (1854-6), a most valuable account of his senatorial experiences and the secret political history of the years 1820-50. In 1856 he ran for governor, but a third ticket in the field defeated him. In the campaign of 1856 he supported Buchanan against his own son-in-law, Fremont, as representing the party of union; but materially changed his mind before his death. In these last two years, though in extreme old age, he carried through the immense and useful labor of compiling an abridgment of the debates in Congress, from the foundation of the government to 1850, published later in 15 volumes. He also published an 'Examination of the Dred Scot Case' (1857).

Benton Harbor, Mich., a city in Berrien County, situated on the St. Joseph's River, one and a half miles from Lake Michigan; on the Cleveland, C. & C., and Père Marquette R.R.'s. It is also connected with the lake by a ship canal and thus by steamboat lines with Chicago and Milwaukee. It has a large trade in lumber, grain, and fruits, especially the latter, and has



THOMAS HART BENTON.

BENTONVILLE—BENZENE

also considerable manufacturing interests, including manufactories of fruit packages, furniture, machinery, flour, vinegar, and canned fruit. Pop. (1900) 6,562.

Bentonville, Ark., a town and county-seat of Benton County, situated northwest of Little Rock; on the Arkansas & O. R.R. It is the seat of Bentonville College, and a Baptist academy; is the centre of a fruit-growing region, has some trade in fruit, tobacco, and grain. It has a large fruit-evaporating plant. Pop (1900) 1,843.

Bentonsville, N. C., a village in Johnston County, noted as the place of a stubborn battle during the Civil War. Here, during his march from Savannah through the Carolinas, Sherman, at the head of 65,000 National troops, encountered 24,000 Confederates under Johnston. A battle took place 18 March 1865, Johnston having come up in great haste from Smithfield, intending to surprise Sherman. The latter, however, was ready for him, and Johnston was thrown on the defensive near Mill Creek. Johnston was partially defeated and retreated to Smithfield.

Bentzel-Sternau, bĕnt'zĕl-stār'now, Count Karl Christian Ernst von, German novelist: b. Mentz, 9 April 1767; d. Mariahalden, Switzerland, 13 Aug. 1843. He is esteemed as a humorist after the manner of Jean Paul; and his satirical romances, 'The Golden Calf' (1802-3); 'The Stone Guest' (1808), 'Old Adam' (1819-20); 'The Master of the Chair,' together form a series

Bentzon, Th., the pseudonym of Marie Thérèse Blanc (q.v.).

Benue, bĕn'wĕ, or **Binue**, a river of west Africa, the chief tributary of the Niger. It rises in the Bub'n Jidda hills on the east of Adamawa, flows for a short distance northwest then west to Bassama, after which its course is generally southwest to its junction with the Niger at Lokoya. Its length is about 850 miles. The source of the Benue was long unknown. Dr Barth, who came upon the river in 1851, while traveling in Adamawa, near the confluence of the Faro, which joins it on its left bank about lat. 12° 30' E, was told that it came from the southeast, a distance of nine days' journey. In consequence of this discovery an expedition was fitted out by the British government for the purpose of exploring the Niger from its mouth upward. The exploration was made in a small steamer called the *Pleiad*, and was under the command of Dr William Balfour Baikie. After reaching the point of confluence of the Benue with the Niger, about lat. 7° 40' N., Dr. Baikie followed the former eastward for a direct distance of about 370 miles. The point thus reached was about lat. 9° 25' N; lon. 11° 30' E. There was sufficient depth of water, though the river was only rising, to allow a still further exploration. The natives, however, had begun to display their hostility in such a manner as made it necessary to return. The result was to show that a large, fertile, and populous tract of a region of Africa previously in a great measure unknown was accessible by means of a navigable river. A second expedition, also under Dr. Baikie, explored the same river in 1857. In 1879 a small steamer belonging to the Church Missionary Society went up the river 140 miles, and its source was discovered by Flegel in 1883.

Benvolio, bĕn-vō'li-o, in Shakespeare's 'Romeo and Juliet,' a friend of Romeo and nephew of Montague.

Benwood, W. Va., a town in Marshall County; on the Baltimore & O. R.R. It is the centre of a large iron-mining region and has several rolling mills and blast furnaces. Pop. (1900) 4,511.

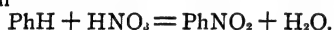
Benzaldehyde, or **Benzo'ic Al'dehyde**, a colorless, volatile oil, familiarly known as "oil of bitter almonds." Benzaldehyde does not occur in the bitter almond in nature, but is formed, when the kernels are crushed and allowed to stand in water, by the decomposition of a glucoside known as "amygdalin." It has the chemical formula $C_6H_5.CO.H$, boils at 354° F, and has a specific gravity of about 1.05, and a refractive index of 1.56. Benzaldehyde is prepared, artificially, by boiling benzyl chlorid with nitrate of lead, copper, or sodium, and subsequent treatment with sodium acid sulphite, with which the benzaldehyde forms a crystalline compound that may be easily separated from the mother liquor by filtration or otherwise.

Benzene, an aromatic hydrocarbon discovered by Faraday in 1825, and called, by him, "bicarburet of hydrogen." It has the chemical formula C_6H_6 , and is the fundamental substance from which the extensive series of "aromatic compounds" is obtained. In 1849, C. B. Mansfield proved its existence in coal tar, and that substance now constitutes its most important commercial source. In the manufacture of benzene, coal tar is distilled at a temperature not exceeding 300° F, and the distillate is treated with caustic soda to remove phenols, and subsequently with sulphuric acid to remove basic substances. It is then re-distilled, the temperature (at least in the upper part of the still) being kept as low as 212° F., in order to prevent toluene from passing over. In order to effect a still further purification, the benzene so obtained may be cooled by a freezing mixture of ice and salt. The true benzene solidifies when thus treated, and the fluid impurities that it contains may be expelled by pressure, or by the aid of a centrifugal drier. Pure benzene is a colorless liquid, strongly refractive, boiling at about 176° F, and freezing at 43° F. It does not mix with water, but mixes readily with alcohol, acetone, glacial acetic acid, chloroform, and ether. It crystallizes in the trimetric system when solidified by cold, and dissolves iodine, phosphorus, sulphur, oils, resins, fats, and alcohols. It expands by about 0.00075 of its own bulk, per degree increase in its temperature, on the Fahrenheit scale. Its specific gravity is about 0.88, and its specific heat is 0.40. For the chemical constitution of benzene, see AROMATIC COMPOUNDS.

Benzene forms two general classes of compounds, known respectively as "addition" and "substitution" products. In forming an "addition" compound, benzene merely takes up atoms or molecules of some other substance, without parting with any of its own atoms; the new substance being simply "added" to the benzene. Benzene hexabromid, $C_6H_6Br_6$, is a good example of a benzene addition compound. It is formed by dropping bromine into boiling benzene, in direct sunlight; the hexabromid crystallizing out upon cooling. The "substitution" compounds of benzene are far more numerous

BENZIDINE

and important than the "addition" compounds, however. They are formed by replacing one or more of the typical hydrogen atoms in the benzene by an equal number of other atoms or monad radicals. The general theory of benzene substitutions is given under AROMATIC COMPOUNDS; but a few of the more important examples of such substitution products may be given here. The radical C_6H_5 (which is not capable of independent existence) is called "phenyl," and is often represented by the symbol Ph. The mono-substitution compounds of benzene, in which one atom of the hydrogen in the original benzene has been replaced by a radical (or by an atom different from hydrogen), may then be regarded as addition compounds of the radical phenyl. Thus "monochlorobenzene," C_6H_5Cl , may also be regarded as chlorid of phenyl, and its formula may be written $PhCl$. Benzene itself may even be regarded as hydrid of phenyl, its formula being written $C_6H_5.H$, or PhH . Carboic acid (or "phenol") is hydrate of phenyl, its formula being $PhOH$, the radical OH being here substituted for one atom of the hydrogen in the original benzene. Nitrobenzene, $PhNO_2$, is formed from benzene (PhH) by the action of nitric acid, in accordance with the equation



It is used in the arts for the manufacture of aniline (q.v.). Aniline itself is an amide of phenyl, obtained by replacing an atom of H in ammonia (NH_3) by phenyl, or by replacing an atom of hydrogen in benzene by the radical NH_2 . The formula of aniline may be written $PhNH_2$, and aniline may be called "amido-benzene," or "phenylamine." (See AMINE and AMIDE) Methyl-benzene, $C_6H_5.CH_3$, in which one of the original hydrogen atoms of the benzene is replaced by the radical CH_3 ("methyl") is also an important benzene substitution compound, and is known to chemists as toluene (q.v.). That portion of the original benzene which remains intact, after a substitution, is called the "benzene residue." In a mono-substitution compound of benzene, further substitutions may be made, by replacing one or more of the hydrogen atoms in the "benzene residue" by monovalent radicals, and secondary, tertiary, and higher substitution compounds may be thus formed. The classification of the secondary substitution compounds is given under Aromatic Compounds. For the classification of higher compounds, special treatises on organic chemistry must be consulted. It may be mentioned, however, that if A, B, C and D are monad radicals, there are no less than 30 distinct substances possible, which shall all have the same general formula $C_6H_2.ABCD$. This fact illustrates the exceeding complexity of the general theory of benzene substitution compounds. The full theory is even more complex than this example indicates, however, for it often happens that the hydrogen in a substituted radical can be replaced by another radical, as well as the hydrogen of the "benzene residue." Thus in methylbenzene (or toluene), $C_6H_5.CH_3$, the radical OH may be substituted for one of the hydrogen atoms. If the hydrogen so displaced occurs in the "benzene residue" the resulting compound will be "cresol," $C_6H_4(OH).CH_3$, a substance which (since it is a di-substitution compound) can exist in three isomeric forms. If, on the other hand, the OH takes the place of

one of the hydrogen atoms of the "methyl" radical, the resulting compound will be "benzyl alcohol," $C_6H_5.CH_2(OH)$.

When a primary amine of the fatty series is acted upon by nitrous acid (HNO_2), the NH_2 group of the amine is replaced by OH , with the formation of an alcohol, but when nitrous acid acts upon aromatic amines, the products are quite different, and are known as "diazocompounds." Thus when nitrous acid acts upon aniline nitrate, a compound having the formula $C_6H_5.N_2.NO_3$, and known as "diazobenzene nitrate," is formed. This is regarded by chemists as a compound of the hypothetical monovalent radical $C_6H_5-N=N-$. When the free affinity of this radical is saturated by the addition of phenyl (C_6H_5), the resulting compound, $C_6H_5.N_2.C_6H_5$, is known as "azobenzene," or as "benzene-azo-benzene." Azobenzene may be prepared by heating nitrobenzene with a solution of $SnCl_2$ in aqueous caustic soda. It is deposited from a solution in benzene in the form of bright red trimetric plates, and owes its importance largely to the fact that aniline yellow, $C_6H_5.N_2.C_6H_4(NH_2)$, is one of its derivatives.

Benzene is an exceedingly inflammable substance, burning with a luminous flame and the generation of a great amount of heat. It is volatile, and its vapor forms a dangerously explosive mixture with air, when present in any considerable quantity. Mansfield, mentioned above as having first demonstrated its existence in coal tar, lost his life, on 25 Feb. 1855, while experimenting with a considerable quantity of benzene, through the mass accidentally taking fire. Benzene may be formed synthetically by heating acetylene gas (C_2H_2) to dull redness in a glass tube. Polymerization occurs, and, among numerous other substances, benzene is formed in accordance with the equation $3C_2H_2 = C_6H_6$. In works on chemistry, benzene is often called "benzol." (Compare BENZINE)

This product is so widely employed in the industry of the aniline dyes that chronic poisoning is by no means uncommon. It is usually breathed as vapor in the vat rooms, and causes, after some exposure, dizziness in the head, ringing in the ears, nausea and vomiting, coughing, and sleepiness, which latter may deepen to unconsciousness, somewhat resembling the narcosis caused by breathing chloroform. In some instances there are blood changes, with cyanosis and death. Treatment by fresh air, oxygen, free diuresis, catharsis and diaphoresis, and if the blood changes are marked, infusion of physiological salt solution may be necessary.

Ben'zidine, an important substance belonging to the benzene (or aromatic) series, and used in the arts for the manufacture of Congo red, chrysamin, and other so-called "coal-tar colors." The coloring matters derived from benzidine have the unusual and valuable property of dyeing cotton without the use of a mordant to fix them upon the fibre. Benzidine has the formula $H.N.C_6H_4.C_6H_4.NH_2$, and is prepared, commercially, by heating nitrobenzene (see BENZENE) with caustic soda and zinc dust, and subsequent treatment with hot dilute hydrochloric acid. Pure benzidine crystallizes in silvery scales which melt at $252^\circ F.$ and boil at a temperature probably above $700^\circ F.$ It is easily soluble in alcohol and ether; it also dissolves readily in hot water, but is almost insoluble in cold water.

BENZINE — BENZYL

Ben'zine, the commercial name for a mixture of the lighter and more volatile hydrocarbons that pass off in the earlier stages of the distillation of crude petroleum. It is essentially different from benzene (q.v.), the latter being a definite chemical substance, belonging in the group of Aromatic Compounds (q.v.); while "benzine" is a more or less indefinite mixture of hydrocarbons that chiefly belong to the paraffin series. Benzine differs but little from naphtha and gasolene, such slight differences as exist being due to variations in the proportions in which the constituent hydrocarbons are present. Benzine is a colorless, mobile liquid, very volatile and inflammable. It is valuable as a solvent for fats, oils, and resins, and is much used about the household as a cleansing agent. Its vapor, when mixed with air, is highly explosive, and serious accidents are common, as the result of using it in the vicinity of lighted lamps or tobacco pipes, or near stoves in which fires are burning. In printing offices it is used for cleaning type, and for removing ink from press rolls. It is also used in large quantities for enriching illuminating gas. Benzine is much lighter than water, and will not mix with it. It boils at from 160° to 190° F.

Poisoning by benzine is rare. The vapor has been used, combined with chloroform and ether, for purposes of narcosis, but it is questionable if it will ever be very popular. Instances of sudden death following the prolonged breathing of benzine vapor have been reported.

Benzo'ic Acid, an organic acid, belonging in the aromatic series, and having the formula C_6H_5COOH . It occurs in benzoin gum, and in certain other resins and balsams. It may be obtained also from the hippuric acid that occurs in the urine of the horse and other herbivorous animals, by boiling that acid with concentrated hydrochloric acid. Benzoic acid is used as a mordant in calico printing, and in the manufacture of aniline blue. It is also used in medicine, and as a preservative agent for anatomical specimens. The benzoic acid that is used for medical purposes is obtained by the direct distillation of benzoin gum over a sand bath, at a temperature of about 340° F. When so prepared, the acid has a pleasant, vanilla-like odor, which is imparted to it by a trace of an aromatic oil that comes over with it from the gum. For most of the purposes for which it is used in the arts, benzoic acid is formed by oxidizing benzyl chlorid with dilute nitric acid.

Benzoic acid dissolves in hot water, but crystallizes out, upon cooling, in needles or pearly prisms. It is soluble in ether, alcohol, and benzene. It melts at 250° F., boils at 480° F., and may be sublimed at intermediate temperatures. Its salts are called "benzoates."

In medicine benzoic acid and its salts, the benzoates (sodium, ammonium, lithium), are widely employed for diseases of the bladder and of the mucous membranes of the lungs. They are also used as intestinal germicides. Benzoic acid has marked bactericidal properties, and may be used for sterilizing purposes. Taken into the intestines it prevents excessive bacterial decomposition; absorbed into the blood it is partly broken up, and in the kidneys is eliminated in part as hippuric acid, rendering the urine acid. It is therefore useful in alkaline fermentations of the urine, particularly in cystitis, pyelitis, etc. Benzoic acid is partly eliminated by the lungs,

here acting to increase the amount of mucus; it is therefore used to loosen the mucus in tight coughs. As a parasiticide, benzoic acid is very valuable in scabies. Benzoates are practically useless in gout.

Benzo'ic Al'dehyde. See BENZALDEHYDE.

Ben'zoin, -zo-in, an aromatic compound, soluble in hot alcohol, and crystallizing in colorless, six-sided prisms having the formula $C_6H_5.CH(OH).CO.C_6H_5$. Benzoin is best prepared by acting upon pure benzaldehyde with a hot alcoholic solution of cyanide of potassium. Upon cooling, the benzoin separates and may be removed by filtration. The action of the cyanide is not known, because the chemical change involved in the foregoing process of manufacture appears to consist merely in the uniting of two molecules of benzaldehyde to form a single molecule of benzoin.

Ben'zoin Gum, -zo-in, or **Gum Benjamin**, a reddish brown resin that exudes from the tree *Styrax benzoin*, which grows in Sumatra, Java, and other parts of the East. It is a mixture of various resinous substances, together with free benzoic acid. Cinnamic acid is also present in the free state in many cases, but it is absent from the Siamese gum. Benzoin gum has a pleasant odor when burned, and for this reason has been much used for incense, and in making pastilles. It has antiseptic properties, and preparations of it are used as a dressing for wounds, and in the manufacture of court-plaster. Benzoin is also administered internally, especially in asthma and other pulmonary affections, and chronic catarrh. It is readily soluble in alcohol, and when the tincture so formed is dropped into water, it forms a white, milky fluid, which is used in France as a cosmetic, under the name "*lait virginal*." The gum is obtained from the styrax-tree by making incisions in the bark, through which the resin oozes. It is allowed to harden by exposure to the air before removal. The best gum is obtained during the first three years of the tree's life, though a good quality may be had for seven or eight years subsequently. The Siamese gum is esteemed more highly than that from Sumatra.

Benzol. See BENZENE.

Benzoni, **Girolamo**, bēn-zō'nē, jē-rō-lā'mō, Italian traveler b. Milan, 1519; d. after 1566. He went to Spanish-America in 1542, visited the principal places then known, and frequently joined the Spaniards in raids on Indian settlements; and after returning to Italy (1556) published a narrative of his adventures, 'History of the New World' (Venice 1565).

Ben'zoyl, -zo-il, in chemistry, the monovalent radical $C_6H_5.CO$. Benzoyl cannot exist in the free state, but it occurs in the combined state in many organic substances. Benzaldehyde (or oil of bitter almonds), $C_6H_5.CO.H$, may be regarded as its hydrid, and benzoic acid, $C_6H_5.CO.OH$, as its hydrate.

Ben'zyl, the monovalent organic radical $C_6H_5.CH_2$, which does not exist in the free state, but which has numerous important compounds. Toluene (q.v.) is its hydrid. Benzylamine, $C_6H_5.CH_2.NH_2$, is derived by substituting benzyl for one of the hydrogen atoms in ammonia, by heating benzyl chlorid with alcoholic ammonia. Benzyl chlorid, which is

used as a source of "oil of bitter almonds" ("benzaldehyde") and of benzoic acid, has the formula $C_6H_5.CH_2Cl$, and is obtained by passing chlorine into cold toluene, in direct sunlight. Benzyl alcohol, $C_6H_5.CH_2(OH)$, is the hydrate of benzyl, and is obtained by the action of an alcoholic solution of potash upon benzaldehyde.

Beothuk, bā'ō-thuk, a linguistic stock of North American Indians, habitants of the region of the Exploits River in northern Newfoundland, and believed to have been limited to a single tribe, the last known survivor of which died in 1829. The Beothuks painted their bodies and their property with red ochre, and from this circumstance their stock and tribal name was derived. They were also known as the Goodnight Indians, from the incorrect translation of a Micmac word that sounded like Beothuk. It is not known whether the Beothuks became extinct by reason of wars and famine or by absorption among other tribes.

Beowulf, bā'ō-wūlf, an Anglo-Saxon epic, the only manuscript of which belongs to the 8th or 9th century, and is in the Cottonian Library (British Museum). From internal evidence it is concluded that the poem in its essentials existed prior to the Anglo-Saxon colonization of Britain, and that it must be regarded either as brought to Britain by the Teutonic invaders, or as an early Anglo-Saxon translation of a Danish legend. From the allusions in it to Christianity, however, it must have received considerable modifications from its original form. It recounts the adventures of the hero Beowulf, especially his delivery of the Danish kingdom from the monster Grendel and his equally formidable mother, and, lastly, the slaughter by Beowulf of a fiery dragon, and his death from wounds received in the conflict. The character of the hero is attractive through its noble simplicity and disregard of self. The poem, which is the longest and most important in Anglo-Saxon literature, is in many points obscure, and the manuscript is somewhat imperfect.

Bibliography.—Morley, 'English Writers,' Vol. I. (1887); Ten Brink, 'Early English Literature' (1883); translation by Garnett (1885); English prose translation by Tinker (1892).

Beppo, a satirical poem on Venetian life by Byron, published in 1818, and named for the chief figure. In Auber's opera, 'Fra Diavolo,' is a character of the same name.

Beppu, bēp'poo, Japan, a bathing place and seaport on the Island of Kyushu, famed for its hot alkaline baths.

Béranger, Pierre Jean de, bā-rān-zhā, pē-ār zhōn dē, national poet of France: b. Paris, 19 Aug. 1780; d. there, 16 July 1857. His father was a restless and scheming man, and young Béranger, left in a great measure to himself, ran a great chance of spending his life as a gamin and vagabond in the streets of Paris. A few days after the destruction of the bastille he was conveyed to Peronne and placed under the charge of an aunt who kept a tavern, and to whom for a time he acted as waiter. At the age of 14 he was apprenticed to M. Laisnez, a printer in Peronne, but after remaining in that employment for some time, was suddenly summoned to Paris by his father, who wished

his assistance. The improvidence and prodigality of his father was constantly involving them in difficulties, and Béranger, with as yet no settled vocation in life, was enduring all the hardships and privation which men of genius in a similar position to himself have frequently had to encounter before the recognition of their talents. He had now, besides making an unsuccessful attempt in the drama, produced a number of poems, including his 'Roger Bontemps,' 'Le Grenier,' 'Les Gueux,' and 'Le Vieil Habit.' Some of these were sent by him in 1804 to Lucien Bonaparte, in the hope thereby of obtaining some patronage or assistance. In this, probably the only application he ever made for aid in the course of a long life, Béranger was not disappointed. Lucien sent for him, encouraged him to proceed in his poetical career, and made over to him his own income as member of the French Institute. He was afterward employed in editing the 'Annales du Musée,' and in 1809 received an appointment as clerk in the office of the secretary to the university. Many of his songs had now become extremely popular and in 1815 the first collection of them was published. A second collection was published in 1821, but Béranger had made himself extremely obnoxious to the Bourbon government by his satires on the established order of things; and in addition to being dismissed from his office in the university, he was prosecuted and sentenced to three months' imprisonment and a fine of 500 francs. A third collection appeared in 1825, and a fourth in 1828, which last publication subjected him to a second state prosecution, an imprisonment of nine months, and a fine of 10,000 francs. Nothing, however, could daunt his spirit, and in prison he still continued to busy himself in the composition of his songs and lyrical satires upon government. In 1833 he published his fifth and last collection, which contains some of the most powerful effusions of his genius. The concluding years of his life were spent in a dignified retirement and he received the honor of a public funeral, at which the most eminent men of France, both of the world of literature and politics, attended.

The great attraction of Béranger's songs is the unequalled grace and sprightliness which they display, combined with great descriptive powers, much comic humor, and occasional bursts of indignation and invective when some social or political grievance is denounced. They are sometimes also, it must be admitted, marked by a tendency to levity and looseness of morals, but in this respect they partake eminently of the French character. No one, indeed, was more thoroughly French than Béranger, and the glory of his beloved *patric*, as paramount to all other considerations, appears constantly as the inspiring genius of his poetry. The intense nationality of his songs constitutes one of their principal charms, and in this respect he bears some resemblance to Thomas Moore. He has sometimes been called the Burns of France, but though like him essentially a poet of the people, he falls far beneath the pathos and depth of feeling displayed by the Ayrshire Bard in depicting the passion of love. In private life Béranger was the most amiable and benevolent of men, beloved by his friends alike for his social qualities and kindness of heart, while his charities were so numer-

BERAR — BERBERA

ous and extensive as often to exceed the bounds of prudence. See Janin, Béranger et son temps' (1866); Sainte Beuve, 'Portraits contemporains'; Nivalet, 'Souvenirs historiques et étude analytique sur Béranger et son œuvre' (1892).

Berar, *bā-rar'*, or the **Hyderabad Assigned Districts**, a commissionership of India, in the Deccan, south and west of the central provinces and north of Hyderabad, touching Bombay territory on the west, with an area of 17,718 square miles. It consists chiefly of a fertile plain bordered on the north and south by low ranges of hills. It is intersected by the Purna, and is partly bounded north and south by the Wardha and Penganga flowing east to the Godavari. It has a fertile soil, which produces much good cotton and millet, the best wheat in India, as well as oil-seeds and other produce. The rainfall is regular, and this province is in the position of being able to export food to other parts of India. It is intersected by the railway from Bombay to Nagpur, and ultimately to Howrah, opposite Calcutta. After being ruled by independent sovereigns, it was added in the 17th century to the Mogul empire, and latterly became part of the Nizam's dominions (Hyderabad), to which it still in a sense belongs. In 1853 it was assigned or handed over to the British authorities to provide for the payment of the body of troops which the Nizam had been previously bound to furnish in time of war for the Indian government. A new treaty was concluded in 1860 by which certain territorial alterations were brought about, and a considerable debt due by the Nizam was canceled. The province has greatly prospered under British rule. It consists of six districts: Ellichpur, Amraoti, Akola, Buldana, Basim, and Wun. The largest towns are Ellichpur and Amraoti (Oomrawuttee). Berar is under the administration of a revenue and fiscal commissioner superintended by the resident at Hyderabad. There is also a judicial commissioner, who superintends the working of the courts of justice. The surplus revenue, after the expenses of administration and the cost of the Hyderabad contingent of troops are defrayed, is handed over to the government of the Nizam. Pop. (1901) 2,752,400

Berard, *Augusta Blanche*, American educator and historical writer. b. West Point, N. Y., 29 Oct. 1824; d. 1901. She was the daughter of a former professor at West Point Military Academy, and her life was spent mainly in teaching. She was the author of school histories of the United States and England; 'Spanish Art and Literature'; 'Reminiscences of West Point in the Olden Time.'

Berard, *bā-rār*, **Frédéric**, French physician. b. Montpellier, 8 Nov. 1789; d. there, 16 April 1828. When only 20 years of age he wrote a thesis entitled 'Theory of Natural Medicine, or Nature Considered as the True Physician, and the Physician as an Imitator of Nature.' He afterward went to Paris, where he was engaged to write in the 'Dictionary of Medical Science.' In 1816 he returned to Montpellier as professor of therapeutics in a private course of lectures to the medical students of the college. At this period he published a work explanatory of the 'Doctrines of the Medical School of Montpellier.' With Rouzet, he pub-

lished Dumas' work on 'Chronic Diseases,' with instructive commentaries. In 1823 he also published in Paris his work on 'The Relations of the Physical and the Moral Organism, as a Key to Metaphysics and the Physiology of Mind.' In this he explains his own views of human nature and the principles of life, in opposition to the views of Cabanis. He also took occasion to publish at the same time, a manuscript letter of Cabanis, on 'Primary or Final Causes,' accompanied by numerous annotations.

Berat, *bā-rat'*, a town of Albania, on the river Beratnos, the ancient Apsus. It is the seat of a pashalic and Greek archbishopric, and was taken by Ali Pasha from his rival Ibrahim. Amurath II captured Berat, and his troops held it notwithstanding a desperate attempt by Scanderbeg with a strong body of Italian auxiliaries to retake it. Pop. 12,000.

Béraud, *Jean*, *bā-rō*, *zhōn*, French painter of great power: b. St. Petersburg, Russia, 1849. After serving with distinction in the French army during the Franco-Prussian war he became a pupil of Bonnat. His subjects are usually chosen from Parisian life. His latest works have been modernized scenes from the New Testament. 'La Madeleine' represents a Parisian harlot at the feet of Christ in a Paris restaurant; the scene of the 'Descent from the Cross,' is Montmartre overlooking Paris, with a group of working men and women.

Beraun, *bā-rown'*, a town of Bohemia, 18 miles to the southwest of Prague, on the river Beraun, with manufactures of cotton, sugar, etc. Pop. (1890) 7,265.

Berbe, a west African, much-spotted genet (*Gemetta pardina*). See GENET.

Ber'ber, a town of Nubia, on the right bank of the Nile, below the confluence of the Atbara. It is a station on the route from Khartum to Cairo, and a point to which caravans go from Suakin on the Red Sea. In the course of Gen. Graham's operations against Osman Digna in 1885, a railway was projected from Suakin to Berber, and the work was actually begun, but was ultimately abandoned when military protection was taken away. Pop. (estimated) 10,000.

Ber'bera, the chief port and town of British Somaliland, on the African coast, of the Gulf of Aden and south of Aden. It has a small but well-sheltered harbor and a long pier; a European quarter with stone houses and warehouses, and a native quarter laid out with broad streets but consisting chiefly of huts or sheds. There is a considerable export trade in the products of the country, such as hides and skins, gums, ostrich feathers, ghee, sheep, goats, and cattle; rice, millet, dates, cottons, tobacco, etc., being imported. The traffic is chiefly with Aden. The population is perhaps 5,000, increased to 30,000 during the trading season. The Somaliland Coast Protectorate extends along the coast for about 400 miles and inland for about 200, the area being about 80,000 square miles. Besides Berbera it contains also the ports of Zeilah and Bulhar. It was acquired in 1884, and is administered by a political agent and a consul. A number of Indian troops are stationed in the territory. The trade is of some importance and is increasing.

BERBERINE — BERCHET

Ber'berine, a poisonous alkaloid discovered by Buchner in 1837 in the root of the common barberry, and now known to exist in many other plants also. It crystallizes, ordinarily, in yellow, silky needles, having the composition $C_{20}H_{17}NO_4 + 4\frac{1}{2}H_2O$; but when thrown down from solution in alcohol the needles are said to be red—probably from the absence of water. Berberine forms numerous salts, and is used to a considerable extent in medicine, occurring in notable quantities in preparations of hydrastis. The alkaloid itself is soluble in from four to five parts of water at ordinary temperatures, and is also moderately soluble in alcohol; but it is insoluble in both ether and chloroform.

Ber'beris, the generic name of the barberry (q.v.).

Berbers, the name of a people spread over nearly the whole of northern Africa. From their name the appellation Barbary is derived. They are considered the most ancient inhabitants of the country. Their different tribes are scattered over the whole space intervening between the shores of the Atlantic and the confines of Egypt; but the different branches of Atlas are their principal abode; while to the south they extend to the Soudan. The chief branches into which they are divided are: the Amazirgh, Amazigh, or Mazigh, estimated to number from 2,000,000 to 2,500,000, and who inhabit Morocco. They are for the most part quite independent of the Sultan of Morocco, and live partly under chieftains and partly in small republican communities. Second, the Shillooh or Shellakah, who number about 1,450,000, and inhabit the south of Morocco. They practise agriculture and carry on some manufactures. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number about 1,000,000; and fourth, the Berbers of the Sahara, who inhabit the oases, and consequently live for the most part at wide intervals from each other. Among the Sahara Berbers the most remarkable are the Beni-Mezâb and the Tuareg. To these we may also add the Guanches of the Canary Islands, now extinct, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion brown, and sometimes almost black, with brown and glossy hair. Individuals of fair complexion and light hair and even with blue eyes are said to be not uncommon among them. They are generally thin, but extremely strong and robust, and their bodies are beautifully formed. The head of the Berber is rounder than that of the Arab, and the features shorter, but of an equally marked character, although the fine aquiline nose, so common among the latter, is not often seen among the Berbers. The language of the Berbers is said to have affinities with the Semitic tongues. Such of them as mingle with the Arabs speak or understand Arabic; but those who dwell in the interior of the mountains understand no other language than their own. The Berbers often leave their mountains to plunder travelers on the plain. They generally dwell in huts, or rude houses, the latter rectangular, with two gable ends, covered with thatch and entered by a low and narrow door. These dwellings are often built in little groups, scattered about in the valleys and upon the sides of the mountains, and in some parts each

group of huts is situated in the midst of a plantation, with a portion of ground laid out as a kitchen-garden. Although the Berbers have always lived in ignorance, and have had but little connection with civilized nations, they are remarkably industrious. By working the mines in their own mountains they produce lead, copper, and iron. With the iron they manufacture gun-barrels, implements of husbandry, and many rudely formed utensils. They understand the manufacture of steel, from which they make knives, swords, and other instruments, not very elegant in form, but of good quality. They likewise make gunpowder for their own use, and this powder is said to be of very superior quality. One of their articles of commerce is a species of black soap, which they make with olive-oil and soda obtained from sea-weed. The tribes inhabiting the borders of the plains and some of the great valleys breed sheep and cattle in considerable numbers. Their sheep are small and yield very little wool. They have likewise numerous herds of goats, which supply them with milk, and of the flesh of which they are very fond. Their cows and oxen are of a small species, but their asses and mules are much esteemed.

Berbice, bër-bēs', a district of British Guiana, intersected by the river Berbice. It extends from the river Abary on the west to Corentyn River on the east, about 150 miles along the coast, the boundary inland not being fixed. The chief town is New Amsterdam; pop. about 9,000. The principal productions are sugar, rum, cotton, coffee, cocoa, and tobacco. The coast is marshy and the air damp. Berbice came finally into British possession in 1815, having previously belonged to the Dutch. Till 1831 it formed a separate colony from Demerara and Essequibo. Pop. (1891) 51,176. See GUIANA.

Berbice, a river of British Guiana; flows generally northeast into the Atlantic. It is navigable for small vessels for 165 miles from its mouth, but beyond that the rapids are numerous and dangerous.

Berchem, bër'n'ēm, or **Berghem**, Nikolaas, Dutch painter: b. Haarlem, 1624; d. there, 18 Feb. 1683. Having studied under his father and Van Goyen, Weenix the elder, and other masters, he spent several years in Italy, where he soon acquired an extraordinary facility of execution. His industry was naturally great, and his innumerable landscapes now decorate the best collections of Europe. The leading features of Berchem's works, besides the general happiness of the compositions, are warmth and coloring, a skilful handling of lights, and a mastery of perspective. His etchings are also highly esteemed. See Buxton and Poynter, 'German, Flemish and Dutch Painting' (1881).

Berchet, bār-shā', **Giovanni**, Italian poet and prose writer: b. Milan, 23 Dec. 1783; d. 1851. He was a friend of Manzoni and Silvio Pellico. In 1826 he became a frequent contributor to a liberal journal at Milan, called the *Conciliatore*. When this was suppressed and its contributors cast into prison or exiled by the Austrian government, Berchet settled in Geneva. At the time of his death he was a member of the Sardinian parliament. His writings include: 'Profugì di Praga'; 'Romanze';

BERCHTA — BERENDT

(Fantasie' (1829). His collected poems appeared in 1863, with biographical sketch.

Berchta, bĕrĕn'ta, a female hobgoblin, in the folk lore of southern Germany, of whom naughty children are much afraid. Her name is connected with the word bright, and originally she was regarded as a goddess of benign influence.

Berchtesgaden, bĕrĕ-tĕs-ga'dĕn, a village of Bavaria, situated in a most picturesque and much-visited region, about 12 miles south of Salzburg, on the Achen, or Alm, a stream which issues from the beautiful lake called the Königssee. It lies on a mountain slope surrounded by meadows and trees, consists of well-built houses, and has a fine old abbey, now a royal residence; the abbey church, with fine Romanesque transepts of the 12th century; a royal villa, etc. Wood-carving is extensively carried on, and there is an important salt mine. It is the principal settlement in the district of the same name. Pop. (1895) 2,349.

Berck, bärk, France, a bathing resort on the English Channel, an hour's ride south from Boulogne. It is the terminus of a railway, and has an excellent beach, a kursaal and two hospitals for children.

Berckheyde, bĕrk'hĭ-dĕ, **Gerrit**, Dutch painter. b. Haarlem, 1638; d. 1698. He was a younger brother of Job Berckheyde and with him was employed at the court of the Elector Palatine. Among his most important works are: 'View of Amsterdam'; 'View of Cologne'; 'View of Heidelberg Carito'.

Berckhyde, **Job**, Dutch architectural and genre painter. b. Haarlem, 1630, d. 1693. He was a pupil of Jacob de Wet and Franz Hals and was accepted as master in the Haarlem Guild in 1654. Of the brothers Berckhyde Job is the finer artist. Some of his most famous paintings are: 'Joseph's Brethren in Egypt' (1669); 'Interior of Old Exchange at Amsterdam' (1678); 'Courtesan's Room'; 'Winter Landscape'; 'Interior of Haarlem Cathedral'; 'Artist's Portrait.'

Bercy, bĕr-se, formerly a village on the Seine (here crossed by a suspension bridge), but since 1860 forming part of the southeastern quarter of Paris. The Parisian wine merchants have here their stores of wine, spirits, etc., and there are several important tanneries, sugar-refineries, and paper-mills. A large palace, Le Grand Bercy, was built by Levau at the close of the 17th century.

Berdiansk, bĕr-dyānsk', a seaport of southern Russia, in the government of Taurida, on the northern shore of the Sea of Azof. It contains many handsome houses, arranged in spacious streets, and has a good anchorage, sheltered on all sides except the south. It is the chief entrepôt for the surrounding governments, and exports large quantities of grain, oil-seeds, and wool. It has also a large inland trade in wood, coal, fish, and salt, the last obtained from apparently inexhaustible mines in the vicinity. Pop. (1897) 24,247.

Berditchev, bĕr-de'chĕf, a city of European Russia, in the government and 129 miles southwest of Kiev. It is an ill-built place, mainly Jewish, but contains several churches and synagogues, and a large Carmelite convent, in the church of which is an image of the Virgin

Mary, the object of pilgrimages. It carries on a considerable trade in corn, wine, cattle, honey, wax and leather. Pop. (1897) 53,728.

Berea, Ky., town in Madison County; on the Louisville & N. R.R., 41 miles southeast of Lexington. It is the centre of a large agricultural section and is the seat of Berea College (q.v.), founded in 1853. Pop. (1900) 1,000.

Bere'a, Ohio, a village in Cuyahoga County, on several railroads; 13 miles southwest of Cleveland, with which, and Elyria and Oberlin, it is connected by electric lines. It was founded in 1829; is lighted by natural gas and electricity; has extensive quarries of sandstone (Berea grit); and is the seat of Baldwin University, German Wallace College (both Methodist Episcopal), and a German orphan asylum. Pop. (1900) 2,510.

Berea College, a co-educational, non-sectarian institution, in Berea, Ky.; organized in 1855. It has 30 members in its faculty, and some 850 students. Its building and grounds are valued at \$150,000, and its library contains 20,000 volumes. The distinguishing feature of the college is its work in the southern mountain region, where it carries on, through traveling libraries, social settlements, and lectures, a very valuable kind of university extension.

Berea Grit, a variety of sandstone, great deposits of which are found at Berea, Ohio. It is widely famous for its evenness of texture, and color, and exemption from the impurities that would deteriorate its marketable value. See CARBONIFEROUS SYSTEM.

Bere'ans, in modern Church history an insignificant sect of dissenters from the Church of Scotland, founded by Rev John Barclay (1734-98) in 1773. They take their title from, and profess to follow the example of, the ancient Bereans (see Acts xvii. 10-13) in building their system of faith and practice upon the Scriptures alone, without regard to any human authority whatever. They agree with the great majority of Christians, both Protestants and Roman Catholics, respecting the doctrine of the Trinity, which they hold as a fundamental article of the Christian faith; but differ from the majority of all sects of Christians in various other important particulars. For instance, they say that the majority of professed Christians stumble at the very threshold of revelation by admitting the doctrine of natural religion, natural conscience, etc., not founded upon revelation or derived from it by tradition. With regard to faith in Christ, they insist, that as faith is the gift of God alone, so the person to whom it is given is as conscious of possessing it as the being to whom God gives life is of being alive, and therefore he entertains no doubts either of his faith or his consequent salvation through the merits of Christ, who died and rose again for that purpose. Consistently with the above definition of faith, they say that the sin against the Holy Ghost is simply unbelief. Their mode of practice and Church government differs but little from those of many other dissenting sects.

Berendt, bā'rent, **Karl Hermann**, German ethnologist: b. Dantzic, 1817; d. 1878. After studying medicine he began to practise in Breslau, where he lectured in the university. In 1851 he went to Nicaragua and thence to Vera

BERENGAR—BERENICE

Cruz, where he devoted some years to ethnological study and research. He subsequently traveled in Yucatan and Guatemala, making a careful study of Mayan dialect. He published 'Analytical Alphabet of the Mexican and Central American Languages' (1869); 'Los escritos de Don Joaquin Garcia Icazbalceta' (1870); 'Los trabajos linguisticos de Don Pio Perez' (1871); 'Cartilla en lengua Maya' (1871).

Berengar, bā-rĕn-gar, two kings of Italy in the 9th and 10th centuries. **BERENGAR I.**, son of the Duke of Friuli by a daughter of Louis-le-Debonnaire, during the confusion which followed on the dissolution of the empire of Charlemagne, laid claim to the crown of Italy, and after a civil war obtained it in 888. At a later period, having been invited by Pope John X. to repel the Saracens who were devastating the south of Italy, he was crowned emperor of Rome. His warlike expeditions had generally been fortunate, and his internal government was generally acceptable to his subjects; but his nobility, jealous of his authority, stirred up a new competitor for the throne in the person of Rudolf II., who invaded Italy in 921, and ultimately obliged Berengar to take refuge in Verona, where he was assassinated in 924. **BERENGAR II.**, nephew of the former by a daughter, was at first Marquis of Ivrea, while the throne of Italy was occupied by Hugo, count of Provence, a tyrant who had incurred the enmity of almost all the great feudal lords of the kingdom. Berengar, taking advantage of this feeling, put himself at the head of a force collected in Germany in 945, and was almost universally welcomed. Hugo abdicated in favor of his son Lothario, who reigned nominally for a few years, and was succeeded in 950 by Berengar, in whom all the powers of the government had previously centred. A quarrel with the Emperor Otho in the following year deprived him of his throne, but he was permitted to resume it on agreeing to acknowledge Otho as his liege lord. In a second quarrel he was not allowed to escape so easily. After losing his territories he shut himself up in the fortress of St Leo, and defended himself bravely till famine compelled him to submit. He was imprisoned at Bamberg, and died there in 966.

Berengaria, bā-rĕn-ga-ri-a, the queen of Richard I of England: d. Le Mans, about 1230. She was a daughter of Sancho VI. of Navarre and was married to Richard at Limasol in Cyprus, 12 May 1191. She remained at Acre while the king was warring with the Saracens and resided in Poitou during his imprisonment in Germany. She became estranged from him soon after his release and seems never to have joined him again. She was buried at Espan in the Church of Pietas Dei, which she had founded.

Berengario, Jacopo, Italian anatomist: b. Carpi, about 1470, d. Ferrara, 1530. He taught anatomy and surgery at Pavia, and finally settled at Bologna till a clamor caused by a rumor that he had got possession of two Spaniards affected by a loathsome disease, and was intending to dissect them alive, obliged him to retire to Ferrara. This rumor, caused doubtless by the fact that Berengario looked upon the dissection of the human body as the only means by which the science of anatomy could be advanced,

points out the source of the many important discoveries which he made, and the others for which he paved the way, leaving them to be followed out by Vesalius, Eustachius, and Fallopius. He is justly regarded as one of the principal founders of modern anatomy. He was also a dexterous operator, and published a practical work entitled, 'De Crani Fractura.'

Berengarius of Tours, French theologian: b. Tours, about 1000; d. 6 Jan. 1088. He is renowned for his philosophical acuteness as one of the scholastic writers, and also for his denial of the doctrine of transubstantiation, although it is a disputed question amongst theologians what the exact position of Berengarius was on this point. He was condemned by several councils and several times recanted, but finally died fully reconciled with the Church. He is the first in theological history to call the doctrine of transubstantiation in question. The Roman Catholics ranked him among the most dangerous heretics. He was treated with forbearance by Gregory VII., but the scholastics belonging to the party of Lanfranc, Archbishop of Canterbury, were irritated against him to such a degree that he retired to the Isle of St. Cosmas, in the neighborhood of Tours, in the year 1080, where he closed his life in pious exercises. On the history of this controversy, which has long occupied the attention of theologians, new light was shed by Lessing in his 'Berengar' (1770), and also by Staudlin, who likewise published the work of Berengarius against Lanfranc. This Berengarius must not be confounded with Peter Berenger of Poitiers, who wrote a defense of his instructor Abelard.

Berenhorst, Francis Leopold von, German military writer: b. 1733; d. 1814. He was one of the first writers by whom the military art has been founded on clear and certain principles. He was a natural son of Prince Leopold of Dessau, and in 1760 became the adjutant of Frederick II. After the Seven Years' war he lived at Dessau.

Berenice, bĕr-e-nĭ'se (a bringer of victory). (1) This was the name of the wife of Mithridates the Great, king of Pontus. Her husband, when vanquished by Lucullus, caused her to be put to death (about the year 71 B.C.), lest she should fall into the hands of his enemies. (2) The wife of Herod, brother to the great Agrippa, her father, at whose request Herod was made king of Chalcis by the Emperor Claudius, but soon died. In spite of her dissolute life, she insinuated herself into the favor of the Emperor Vespasian and his son Titus. The latter was at one time on the point of marrying her. (3) The wife of Ptolemy Euergetes; who loved her husband with rare tenderness, and when he went to war in Syria made a vow to devote her beautiful hair to the gods if he returned safe. Upon his return Berenice performed her vow in the temple of Venus. Soon after the hair was missed, and the astronomer Conon of Samos declared that the gods had transferred it to the skies as a constellation. From this circumstance the seven stars near the tail of the Lion are called *Coma Berenices* (the hair of Berenice).

Berenice, a city of Egypt, on the Red Sea, whence a road, 258 miles in length, extended across the desert to Coptos, on the Nile. This

road was constructed in the reign of the second Ptolemy. Berenice was one of the principal centres by which the trade of Egypt, under the Macedonian dynasty, and that of the Romans subsequently, were carried on with the remote East. During the Roman period, a sum equal to \$2,000,000 is said to have been annually remitted to the East by the Roman merchants as payment for its precious products, which sold at Rome for a hundred-fold more than their original price. Nothing now remains of Berenice but a heap of ruins, adjoining the modern port of Habest. **BERENICE**, or *Hesperis*, a city of Cyrenaica, near which the ancients imagined the gardens of the Hesperides to be situated. The village, named Bengazi (q.v.), now occupies a portion of its site.

Berenson, Bernhard, Russian-American art critic b. Wilna, Russia, 26 June 1865. He was educated in the schools of Boston and at Harvard University and has lived for many years in Florence, Italy. He has contributed much in the way of art criticism to the *New York Nation* and to French and German art reviews, and has published 'Venetian Painters of the Renaissance' (1894); 'Lorenzo Lotto: An Essay in Constructive Art Criticism' (1895); 'Florentine Painters of the Renaissance' (1896); 'Central Italian Painters of the Renaissance' (1897); 'The Study and Criticism of Italian Art' (1901).

Beresford, bër'es-ferd, Lord Charles William de la Poer, English naval officer b. Ireland, 10 Feb. 1846. He became a rear-admiral in 1897. In 1882 he commanded the Condor in the bombardment of Alexandria, and was especially mentioned and honored for his gallantry. After the bombardment he instituted an efficient police system in the city. In 1884-5 he served on Lord Wolsley's staff in the Nile Expedition; and subsequently commanded the naval brigade in the battles of Abu Klea, Abu Kru, and Metemmeh. He commanded the expedition which rescued Sir Charles Wilson's party in "Safia," and was commended for his gallantry in both Houses of Parliament. He received the thanks of the French government for assisting the grounded Seignelay. In 1893-6 he was in command of the naval reserve at Chatham, and in December 1899 was appointed the second in command of the British squadron mobilized in the Mediterranean Sea. Lord Beresford accompanied the Prince of Wales on his visit to India in 1875-6, as naval aide-de-camp, and held the same relation to the queen in 1896-7. He has sat at various times in Parliament, as member for Waterford, East Marylebone, York, and Woolwich. Besides numerous honors for gallantry as an officer he has received three medals for saving life at sea under trying circumstances. In 1898 he visited China at the request of the Associated Chambers of Commerce of Great Britain to make a study of the complicated commercial conditions existing there; and on his return, in 1899, he passed through the United States, and was received with distinguished honors by official and commercial bodies. He has done much to promote the "open door" policy as a condition of international commerce in China. His publications include 'Life of Nelson and His Times'; 'The Break-Up of China' (1899), and many essays and special articles.

Beresford, William Carr, Viscount, English general, was a natural son of the first Marquis of Waterford: b. 2 Oct. 1768; d. Bedgebury Park, Kent, 8 Jan. 1854. He entered the army, and served at Toulon, and in Corsica; in the West Indies under Abercromby; and in Egypt under Baird. In 1806 he was raised to the rank of brigadier-general, and the same year commanded the land force in the expedition to Buenos Ayres. Having been ordered to Portugal in 1808, he was intrusted there with the remodeling of the Portuguese army—an office which he accomplished with great success; and in acknowledgment of his services was created a Marshal of Portugal, Duke of Elvas, and Marquis of Santo Campo. He subsequently took part in the siege of Badajoz, and the battles of Salamanca, Vittoria, and Bayonne. For his bravery at the battle of Toulouse he was raised to the peerage, with the title of Baron Beresford, afterward superseded by that of Viscount Beresford, conferred on him in 1823. In political principles he was a high Conservative; and a thorough supporter of the Duke of Wellington. In 1828, when the Duke became premier, he was made master-general of the ordnance, a post he held till 1830.

Berezin, byër-yë-zën', Ilya Nikolayevitch, Russian Orientalist: b. 1818; d. 1896. He studied Oriental philology at the University of Kazan, where in 1846 he was appointed professor, and in 1855 became professor of Turkish at the University of St. Petersburg. Some of his important works in Russian are 'Library of Oriental Authors' (1849-51); 'Tour Through Daghestan and Trans-Caucasia' (1850); 'A Grammar of the Persian Language' (1853); 'The Mongol Invasion of Russia' (1852-4); 'Popular Turkish Sayings' (1857). He wrote in French 'Recherches sur les dialectes Musulmans' (1848-53), and edited the 'Russian Encyclopedic Dictionary' in 16 volumes.

Berezina, byër-yë-ze-na', a river in the Russian province of Minsk, rendered famous by the passage of the French army under Napoleon, 26-27 Nov. 1812. Admiral Tchitchakoff, with the Moldavian army, forced his way from the south to join the main army, which, after Borizoff had been retaken, was to assist the army led by Wittgenstein from the Dwina, and in this manner cut off Napoleon from the Vistula. Napoleon was therefore obliged to make the greatest efforts to reach Minsk, or at least the Berezina, and to pass it earlier than the Russians. After the advanced guard of the Moldavian army had been repelled to Borizoff by Oudinot, and the bridge there burned by them, early in the morning of 26 November, two bridges were built near Sembin, about two miles above Borizoff, an undertaking the more difficult, because both banks of the river were bordered by extensive morasses, covered, like the river itself, with ice not sufficiently strong to afford passage to the army, while other passes were already threatened by the Russians. Scarcely had a few corps effected their passage, when the greater part of the army, unarmed and in confusion, rushed in crowds upon the bridges. Those who could not hope to escape over the bridges sought their safety on the floating ice of the Berezina, where most of them perished, while many others were crowded into the river by their comrades. Besides the multitudes who were obliged to remain beyond the Berezina, the division of Par-

BEREZOV — BERGAMI

tonneaux, which formed the rear-guard, was also lost. It was intrusted with the charge of burning the bridges in its rear, but it fell into the hands of the enemy. According to the French bulletins only a detachment of 2,000 men, who missed their way, was taken; according to the Russian accounts the whole corps, 7,500 men and five generals. The river is a tributary of the Dnieper and has a course of some 335 miles. A canal system connects it with the Dwina.

Berezov, byër-ya'zōf (the town of birch-trees), a town in Siberia, in the government of, and 400 miles north from, Tobolsk, on a height above the left bank of the Sosva, one of the branches of the Obi. It consists of wooden houses carefully built of large timbers, and generally with high steps in front, and contains three churches and a chapel. Its inhabitants, who are chiefly Cossacks, subsist by the chase and by fishing; they barter furs, skins, fish, etc., for flour, flesh-meat, tobacco, iron-ware, and brandy, brought by the Tobolsk dealers, whose craft are floated down the Irtysh into the Obi. Prince Menzikoff, the favorite of Peter the Great, died here in exile in 1731, having been banished by his grandson Peter II. Pop. (1897) 1,073.

Berezovsk, byër-yā-zōvsk', a village in the Russian province of Perm, near Ekaterinburg, which gives name to a famous gold field, wrought since 1744. The mines are on the eastern slopes of the middle Ural chain, and the field is more than five miles long. The washings on the Berezovka River are also very productive.

Berg, bērg, **Friedrich Wilhelm Rembert**, Russian general: b. 1790; d. 1874. He is chiefly notorious for the severity with which he treated the unfortunate population of Poland during the insurrection of 1863, and which excited the horror and indignation of the civilized world.

Berg, berg, **Joseph Frederick**, American clergyman: b. Antigua, W. I., 3 June 1812; d. New Brunswick, N. J., 1871. He came to the United States in 1825, entered the German Reformed ministry, in which he served, 1835-52, and then entered the Dutch Reformed Church and was professor of theology in the Dutch Reformed Theological Seminary at New Brunswick from 1861 till his death. He was distinguished for the intensity of his opposition to the Roman Catholic Church, on which theme he wrote extensively, his best known work being 'Synopsis of the Moral Theology of Peter Dens, as Prepared for Romish Seminaries and Students of Theology' (1842).

Berg, an ancient duchy of Germany, now included in the governments Arnsberg, Cologne, and Dusseldorf. It extended along the Rhine from the Ruhr to the frontiers of Nassau, and is everywhere hilly. It is more a manufacturing than an agricultural district, and has long been famed for its minerals, which include iron of the finest quality, lead, copper, zinc, and the precious metals. In addition to the employment furnished by these minerals, the inhabitants, who are very industrious, have with considerable success superadded textile manufactures. It is now indeed the chief manufacturing district in Germany, and the most densely peopled. It contains the important towns of Elberfeld and Barmen. The duchy of Berg, founded in 1389, had been long consolidated with the

Prussian dominions when (1806) Napoleon revived the title, and conferred it, with an enlarged territory, on Murat. On Murat's receiving the kingdom of Naples, Napoleon named his nephew Louis Napoleon (brother of the late Emperor Napoleon III.) hereditary Grand-duke of Berg, and increased its limits still farther. At the Congress of Vienna, in 1815, the whole was given to the king of Prussia.

Berga, a town of Spain, in the province of Barcelona, in a hilly district near the river Lobregat. There is an old castle overlooking the town, which carries on some manufactures of cottons. Pop. (1903) 6,072.

Bergama, bērg'a-mā, a town of Asia Minor, about 20 miles inland from the west coast, on the Selinus, a tributary of the Caicus, 46 miles north by east of Smyrna. It occupies the site of the ancient Pergamus (q.v.), and contains numerous remains attesting its ancient magnificence. In the centre are the remains of a large Roman basilica, a Byzantine church now converted into a mosque, and a curious double tunnel 200 yards long through which the river runs. To the east of the town is a steep hill with the acropolis and the remains of a Roman palace on the top. To the west of the town are the ruins of the ancient amphitheatre with arches of fine workmanship. It was built so that the arena could be flooded with water from a stream, thus affording an opportunity for nautical sports. Bergama is a flourishing town noted for its manufactures of morocco leather. Pop. about 6,000.

Bergami, **Bartolommeo**. The celebrated trial of Queen Caroline, wife of George IV. of England, was principally founded upon a charge of adulterous intercourse with Bergami, who, in 1814, upon recommendation of the Marquis Ghislieri, in whose previous employment he had been, was attached to her household. Bergami, who had fought his way up in the Italian army from a common soldier to the rank of quartermaster, belonged to a respectable family, and the Marquis Ghislieri described him to the queen as a person of character and attainments superior to his condition, and bespoke for him a kind treatment. This, and the personal advantages of Bergami, who was singularly good-looking, combining athletic strength and stature with almost feminine beauty, naturally disposed the queen in his favor. Moreover, he was full of loyalty and devotion, and on one occasion nearly became the victim of poison intended for her. The queen treated his whole family, especially a little child of his, with the greatest generosity and kindness. All these circumstances were used by her enemies as so many indications of her criminality, and during the trial one of the Italian witnesses, Teodore Majocchi, excited special indignation by his admitting every fact unfavorable to the queen, and by answering every question which might tell in her favor with *Non mi ricordo*. Bergami, who was at Pesaro during the trial, exclaimed, when he was apprised of her acquittal, but at the same time of her death, that she had been poisoned, and never could be convinced to the contrary. To the last he ever spoke of the queen with the greatest reverence and affection, and his deportment before and after her death led to the

BERGAMO — BERGEN-OP-ZOOM

conclusion that he looked upon her rather as a benefactress than as a mistress. However, wherever he went he became the observed of all observers. During his occasional excursions to Paris his apartments were crowded with visitors, consisting principally of ladies, who, under the pretext of having been friends of Queen Caroline, gratified their curiosity and obtained an interview with the portly courier. When at home he lived in great splendor; in the capitals of Italy, Rome, Naples, Milan, he was a lion, and the houses of "the best families" were open to him. At the time of the trial many different statements about Bergami's character were circulated in the House of Lords, but however contradictory in many other respects, they all agreed in this one fact, that he was as inoffensive as he was good-looking a person, who probably would never have been heard of beyond the precincts of Italian barracks if it had not been for his relation with Queen Caroline, and for the peculiar construction which was put upon it by her enemies at the trial. His name in England was, by a curious mistake, spelled with a P

Bergamo, bĕr'ga-mō, Italy, city and capital of the province of Bergamo, situated in the district lying between the rivers Brembo and Serio. It consists of two distinct portions, the Città Alta (High Town), situated on hills, and now attainable by a cable tramway, and the much more extensive new quarters in the plain. Bergamo trades largely in silk, silk goods, grain, etc. At its fair goods to the value of a million sterling have sometimes been sold. It has an academy of painting and sculpture, a museum, an athenæum, a public library, several secondary schools, and various manufactories, especially of silk. There is a cathedral, but some of the other churches are of greater interest. There is a small Protestant congregation. The comic characters in the Italian masked comedy are Bergamese, or affect the dialect of the country people in the neighborhood of this city. In 1796 Bonaparte took Bergamo, and it was subsequently made the capital of the department of the Serio, in the kingdom of Italy. Among many distinguished men born here are Tiraboschi, the historian of Italian literature; the composer Donizetti, and Cardinal Mai. Pop. (1901) 46,000.

Ber'gamot, a shrub or small tree of the genus *Citrus* (natural order *Butaceæ*) variously placed as a variety of the orange (*C. aurantium*) and of the citron (*C. medica*). The plant is largely cultivated in southern Europe, especially Italy, for its green, bitter volatile oil, known as oil or essence of bergamot which is expressed or distilled from its highly aromatic rind for use in perfumery. The name is also applied, mainly in Europe, to many varieties of pears and in both Europe and America to several species of the natural order *Labiata*; for example, *Mentha aquatica* (Europe), *Monarda didyma* and *M. fistulosa* (America). The name seems to be a corruption of the Turkish *beg armâdi*, a lord's pear. See *CITRUS*.

Bergedorf, bĕrg'ĕ-dōrf, a town of Germany, 10 miles southeast of Hamburg, and in the territory belonging to that city, on the Bille, a tributary of the Elbe. It has flourishing glass works and manufactures of enamel ware. It was held jointly by Lubeck and Hamburg till

1867, when Lubeck assigned its rights to Hamburg on payment of 200,000 thalers. Pop. (1900) 10,243.

Bergen, Joseph Young, American educator: b. Red Beach, Me., 22 Feb. 1851. He graduated at Antioch College, Ohio, 1872, and for a time was on the Ohio Geological Survey and professor of natural sciences at Lombard University, becoming later a teacher of science in the Boston high and Latin schools. He is joint author of 'The Development Theory: the Study of Evolution Simplified for General Readers' (1884); Hall and Bergen's 'Physics'; 'Elements of Botany'; and 'Foundations of Botany.'

Bergen, Norway, a seaport on the west coast, capital of a province or diocese of the same name, formerly the principal town of the kingdom, but now the second. It is 186 miles northwest of Christiania, and about 25 from the open sea, and is situated on and about the head of two inlets, one of which forms the harbor. The tongue of land between the harbor and the other inlet (Puddefjord) is an elevated ridge crowned by an old fort, while the entrance on the other or northeast side is commanded by the old fortress of Bergenhus, now partly used as a prison. Rocky hills from 800 to 2,000 feet high encircle the town on the land side and furnish many picturesque spots. The climate is comparatively mild, on account of the sheltered situation, but is remarkable for rain, the annual rainfall being about 73 inches. The town is well built and clean, but the houses are mostly of wood, and many of the streets are crooked and uneven, on account of the irregularity of the site. There are a number of squares or open spaces, including the market-place. There is a cathedral (built in 1537), and several other churches, the oldest being St. Mary's, built after a fire in 1249. The public institutions include schools, a library of 60,000 volumes, a theatre, a museum, and other useful institutions. The inhabitants of the middle coast of Norway bring timber, tar, train-oil, hides, etc., and particularly dried fish (stock-fish), to Bergen to exchange them for grain, flour, and other necessities. The town carries on a large trade in these commodities, and its exports of dried fish, herrings, tar, etc., are especially large. A considerable amount of ship-building is carried on. A United States consul is resident here. Bergen was founded by King Olaf Kyrre in 1070. The Hanseatic league established a factory here about 1340 and long monopolized the trade. Bergen is the native place of the poet Holberg. Pop. (1901) 72,179.

Bergen-Op-Zoom, bĕrg'en-öp-zōm', a town of Holland, in a marshy situation on the Scheldt, where the Zoom enters it, 20 miles north-northwest of Antwerp. It was formerly a strong fortress, the morasses around it making it almost inaccessible to an assailing force, while its fortifications consisted of regular works, constructed by the celebrated Coehorn. It is well built, but has no edifices deserving of particular notice. It made an important figure during the Spanish war, and successfully resisted the attacks of the Duke of Parma in 1581 and 1588, and of Spinola in 1622. It was taken by the French in 1747 after a siege of nearly three months; and in 1795 the French under Pichegru again gained possession of it by capitula-

BERGENGREN — BERGK

tion. It was unsuccessfully attempted by the British under Sir Thomas Graham, afterward Lord Lynedoch, in 1814. Its trade has suffered greatly from the proximity of Antwerp. Pop. (1899) 13,668.

Berg'engren, Anna (FARQUHAR), MARGARET ALLSTON, American novelist: b. Brookville, Ind., 23 Dec. 1865. She is the wife of R. Bergengren, (q.v.), and has published 'The Professor's Daughter' (1899); 'Her Boston Experiences' (1900); 'The Devil's Plough' (1901); 'Her Washington Experiences' (1901).

Bergengren, Ralph Wilhelm Alexis, American journalist and cartoonist: b. Gloucester, Mass., 2 March 1871. He has published a collection of verses and cartoons entitled 'In Case of Need' (1899).

Bergerac, bâr-zhrak, Cyrano de, a famous five-act tragedy by Edmond Rostand, founded on the life of Savinien Cyrano de Bergerac. It was first played in Paris, 28 Dec. 1897, with Coquelin in the title role and in New York 3 Oct. 1898 with Mansfield in the same role. See ROSTAND, EDMOND

Bergerac, Savinien Cyrano de, French author: b. 1619; d. 1655. He was distinguished for his courage in the field, and for the number of his duels, more than a thousand, most of them fought on account of his monstrously large nose. His writings, which are often crude, but full of invention, vigor, and wit, include a tragedy, 'Agrippina,' and a comedy, 'The Pedant Tricked,' from which Corneille and Molière have freely borrowed ideas; and his 'Comical History of the States and Empires of the Sun and the Moon' probably suggested 'Micromégas' to Voltaire, and 'Gulliver' to Swift. His works have been frequently republished. He was made the hero of a drama bearing his name, written by Edmond Rostand, the French playwright, which had a phenomenal success in the United States in 1899-1900, and was the occasion of a suit for plagiarism. See ROSTAND, EDMOND

Bergerac, a town of France, in the department of the Dordogne, and on the river Dordogne. Among its industries are paper-mills, ironworks, distilleries, etc. The town, 48 miles east of Bordeaux, gives the name to an agreeable wine cultivated on the banks of the Dordogne, in France sometimes called *petit champagne*. Pop. (1896) 15,642

Bergerat, bârzh-ra, Auguste Emile, French journalist, playwright, and novelist: b. Paris, 29 April 1845. He is son-in-law of Théophile Gautier, and since 1884 particularly known as the amusing chronicler of the 'Figaro' under the pseudonym of CALIBAN. His *feuilletons* for that paper were published collectively as 'Life and Adventures of Sieur Caliban' (1886); 'The Book of Caliban' (1887); 'Caliban's Laughter' (1890), etc. He also wrote two novels, 'Faublas in Spite of Himself' (1884); 'The Rape' (1886); besides two volumes to the memory of his father-in-law, 'Théophile Gautier, Painter' (1877), and 'Th. Gautier, Conversations, Souvenirs, and Correspondence' (1879).

Bergh, bérgh, Henry, American philanthropist and author: b. New York, 1823; d. there, 12 March 1888. He was educated at Columbia College, and from 1861 to 1864 was in the diplomatic service, being secretary of the American

legation and United States consul at St. Petersburg. In 1865 he founded the American Society for the Prevention of Cruelty to Animals, was chosen its president, and in 1866 secured the passage of an act giving the society the power of making arrests and carrying on prosecutions for violations of the statute on which the organization was instituted. He remained president of the society until his death, being ever its guiding spirit, living entirely in its work, and serving without compensation. At the beginning of his work no State or Territory had any statute relating to the prevention of cruelty to animals. At the time of his death 39 States had proper laws on the subject, and in 36 of them branch societies of the organization had been formed. He was the author of a volume of tales and sketches 'The Streets of New York'; a successful drama, 'Love's Alternative,' produced in Baltimore, 1881; 'The Portentous Telegram'; 'The Ocean Paragon'; and 'Married Off a Poem' (1859).

Bergh, Johann Edvard, Swedish landscape artist: b. Stockholm, 1828; d. 1880. He was a professor in the Stockholm Academy and is looked upon as the founder of a new school of landscape art in Sweden, distinguished by accurate drawing, intelligent representation of nature, and a very decided nationalism. Among his most noted subjects are 'Wood Interior'; 'View of Stockholm'; 'View in Dalecarlia'.

Bergh, Pieter Theodoor Helvetius van den, Dutch dramatist and poet: b. Zwolle, 1793; d. 1873. He attracted attention with his comedy 'The Nephew' (1837), considered one of the best in modern Dutch literature, but did not justify expectations by his subsequent dramatic efforts. He also published 'De Nichten,' and a collection, 'Prose and Poetry' (3d ed. 1863).

Berghaan, bérgh'an, a Dutch and colonial name in South Africa for several large hill-haunting eagles, especially the *bataleur* (q.v.).

Berghaus, bérgh'ows, Heinrich, German geographer: b. Cleve, 3 May 1797; d. Stettin, 17 Feb. 1884. He served in 1815 in the German army in France, and was from 1816 to 1821 employed in trigonometrical survey of Prussia under the war department. From 1824 to 1855 he was professor of applied mathematics in the Berlin Academy of Architecture. Besides his various maps and his great 'Physical Atlas' (republished in a remodeled form in 1886-92), he published 'Allgemeine Länder-und Völkerkunde' (1837-41); 'Die Völker des Erdballs' (1852); 'Grundlinien der physikalischen Erdbeschreibung' (1856); 'Grundlinien der Ethnographie' (1856); 'Deutschland seit hundert Jahren' (1859-62); 'Was man von der Erde Weiss' (1856-60); 'Sprachschatz der Sassen, or Low German Dictionary' (incomplete); etc.

Berghem, Nikolaas. See BERCHEM, NIKO-LAAS.

Bergk, Theodor, German classical philologist: b. Leipsic, 22 May 1812; d. Ragaz, Switzerland, 20 July 1881. He became an indisputable authority on Hellenic poetry, producing two works of surpassing importance in that department of scholarship: 'Greek Lyric Poets' (4th ed. 1878-82), and 'History of Greek Literature' (1872); the latter not quite completed at his death, but brought to perfection with the aid of his posthumous papers. He contributed

BERGMANN—BERIBERI

much of value, likewise, to our knowledge of special departments of classical learning.

Bergmann, Ernst von, German surgeon: b. Riga, 16 Dec 1836. He served in the Prussian army 1866-70; was professor of surgery in the University of Wurtzburg 1878-82, and was appointed director of the surgical clinic at the University of Berlin in 1882. He wrote 'The Putrid Poison'; 'The Embolism of Fatty Tissues'; 'The Poison'; 'Instruction Concerning the Putrid Intoxication,' etc.

Bergmann, Julius, German philosopher: b. Opherdike, Westphalia, 1840. He was professor of philosophy at Marburg from 1875. Among his more important writings are 'Grundlinien einer Theorie des Bewusstseins' (1870); 'Zur Beurteilung des Kriticismus' (1875); 'Reine Logik' (1879); 'Sein und Erkennen' (1880); 'Der Grundprobleme der Logik' (1882); 'Geschichte der Philosophie' (1892-4); 'Untersuchungen über Hauptpunkte der Philosophie' (1900).

Bergmann, Karl, American musician: b. Ebersbach, Saxony, 1821; d. New York, 10 Aug. 1876. Participation in the revolutionary outbreaks of 1848 obliged him to go into exile and he came to New York. He organized and conducted the first great German music festival, held in the Winter Garden Theatre (1855); in 1856 introduced German opera at Niblo's Garden, and for several years prior to his death conducted the concerts of the Philharmonic Society. He composed several orchestral pieces, and excelled as a player of the violoncello and the piano.

Bergmann, Torbern Olof, Swedish natural philosopher and chemist. b. Katharineberg, West Gothland, 20 March 1735; d. 1784. In 1758 he became doctor of philosophy and professor of physics at Upsal. Upon the resignation of the celebrated Wallerius, Bergmann was a candidate for the professorship of chemistry and mineralogy. His competitors charged him with ignorance of the subject, because he had never written on it. To refute them he shut himself up for some time in a laboratory, and prepared a treatise on the manufacture of alum, which is still considered as a standard work. In 1767 he became professor of chemistry, and devoted himself with ardor to this science. He invented the preparation of artificial mineral waters, and discovered the sulphuretted hydrogen gas of mineral springs. We are indebted to him for a knowledge of the characters which distinguish nickel from other metals. On a number of minerals he made chemical experiments, with an accuracy before uncommon. He published a classification of minerals, in which the chief divisions are based on their chemical character, and the subdivisions on their external form. In preparing this work he was much aided by his former discovery of the geometrical relations between different crystals of the same substance, which may be deduced from one primitive form, and are produced by the aggregation of similar particles, according to fixed and obvious laws. His theory of the chemical relations is still esteemed, and although it has received new developments from the further researches of Berthollet, has not been overthrown. The order of Gustavus Vasa was bestowed on Bergmann. Among his works the first place is due to 'Opuscula Physica, Chémica, et Mineralia' (1779-94), of which

an English translation appeared. His famous essay on 'Elective Affinities' was translated into English by Dr. Beddoes.

Bergmehl, bērg'māl, a whitish earth, consisting almost entirely of the flinty shields of microscopic plant growths. It occurs in bog and ancient lake deposits in many parts of northern Europe, and, during times of great scarcity, it has been, when mixed with flour, eaten as food. Some writers assert that hundreds of carloads are consumed every year by the inhabitants of northern Sweden. From analysis, it does not appear to contain any positive nutriment.

Bergsoe, bērg'sē, Jorgen Vilhelm, Danish novelist, poet, and naturalist: b. Copenhagen, 8 Feb. 1835. While suffering partial blindness, caused by excessive use of the microscope in his memorable biological researches at Messina, he turned to literary composition, and soon appeared the first of a cycle of novels, 'From the Piazza del Popolo' (1866), which had an extraordinary success. The following year he published his first volume of poems, 'Now and Then'. Of his many novels, the one which excels for fineness of touch is, 'Who was He?' All his stories are characterized by rich imagination, fine observation, and great originality, his poetry is inferior in these respects to his prose.

Bergues, bārg, France, a town in the department of Le Nord, in a marshy district, five miles south of Dunkirk; population (1891), 5,380. It ranks as a fortress of the second class, is well built of brick, and having a basin which admits vessels of 250 tons, is the centre of a considerable trade. Its principal edifices are the townhouse, and a beautiful and richly ornamented belfry about 160 feet high. It owes its origin to the castle of Berg, to which St Winnoc retired in 902, was first fortified by Baldwin II., Count of Flanders, afterward adorned with a magnificent monastery of St Winnoc by Baldwin IV., and in the 13th century possessed flourishing manufactures. It suffered dreadfully during the wars in the Low Countries. Pop. (1896), 4,700.

Ber'gut, or **Bearcoot**, the Tartar name in Central Asia for the golden eagle (see **EAGLE**), there trained by Kirghiz for use in falconry.

Berhampur, ber-hām-poor', the name of two towns of India. (1) The capital of the Ganjam district, Madras, 525 miles northeast of Madras, with which it is connected by rail. A good road leads from it to the coast town of Gopalpur, nine miles distant. As the headquarters town of the district, it contains the usual official buildings. Silk cloth is manufactured, and there is a considerable trade in sugar. The climate is unhealthy. Pop. (1891), with cantonment, 25,653. (2) A town of the Moorshedabad district, Bengal, on the left bank of the Bhagirathi, 5 miles south of Moorshedabad. The first open act of the Sepoy mutiny took place here on 25 Feb. 1857. The town contains a government college. Pop. (1891) 23,515.

Beriberi, bā-rī-bā'ri, an epidemic form of multiple neuritis formerly very prevalent in China, but now common in Japan, the Philippines, and associated tropical countries. It is said to be not infrequent among sailors in and about the ports on the Gulf of Mexico, particu-

BERING—BERING SEA CONTROVERSY

larly New Orleans (Bondurant). It is supposed to be of bacterial origin, although an exclusive rice diet is claimed to be at least a predisposing cause. The disease exhibits three main types, an acute pernicious, the atrophic or dry, and the dropsical or wet forms. The symptoms are those of a multiple neuritis (q.v.), and the treatment is that for this disease.

Bering, be'ring, or Behring, Vitus, Danish navigator: b. Horsens, 1680; d. 19 Dec. 1741. Being known as a skilful seaman, he was employed by Peter the Great in the navy established at Cronstadt. His talents and the undaunted courage displayed by him in the naval wars against the Swedes, procured him the honor of being chosen to command a voyage of discovery in the sea of Kamchatka. He set out from St. Petersburg, 5 Feb. 1725, for Siberia. In the year 1728 he examined the northeastern coasts of Asia, discovered the strait named after him, and proved that Asia is not united to America. It remained, however, to be determined whether the land opposite to Kamchatka was in reality the coast of the American continent, or merely islands lying between Asia and America. On 4 June 1741 he sailed, with two ships, from Okhotsk, and touched the northwest coast of America. Tempests and sickness prevented him from pursuing his discoveries; he was cast on a desolate island covered with snow and ice, where he died. See *Life* by Lauridsen (Chicago 1890).

Bering Sea, that part of the north Pacific Ocean between the Aleutian Islands, in 55°, and Bering Strait, in 66° N., by which latter it communicates with the Arctic Ocean. It has on its west side Kamchatka and the Chukchi country, with the Gulf of Anadyr, and on its east the territory of Alaska, with Norton Sound and Bristol Bay; contains several islands, and receives the Yukon River from North America and the Anadyr River from Asia. Fogs are almost perpetual in this sea. Ice is formed and melted in the sea every year, the northern part becoming closed to navigation about the beginning of November. Pack ice gradually extends southward to a little below the latitude of St. Matthews Island (60½°), beyond which ice is found in floes. The southern limit of the ice usually extends from Bristol Bay, Alaska, to about 35 miles south of Pribilof Island, though in exceptionally severe winters it reaches as far south as Unimak Pass. It usually leaves Pribilof Island about 1 May, and vessels following in its wake may reach Bering Strait between about 15 and 25 June. A strong and comparatively warm current sets northward at about two to three knots an hour, through Bering Strait, and after following the Siberian shore turns north toward Herald Island. A cold current also passes out through the strait.

Bering Sea Controversy, an international dispute over the territorial status of that sea, chiefly between the United States and Great Britain, and growing out of attempts of the former to protect its fur-sealing industries there from the Canadian subjects of the latter. This industry rests on three great herds in the North Pacific, which resort regularly to certain islands in the breeding season, from May or June till the autumn storms, then move southward to about 35° N., and gradually work northward the next spring. At the islands the elder

males remain with the young on the beach while the females go in search of food, sometimes 200 miles. The younger males, or "bachelors," two to four years old, herd apart, and should furnish all the commercial sealskins, the pelts of the old males being unsalable and the killing of females a blow at the continuance of the species. But this selection can only be made on shore; pelagic or ocean sealing is at best indiscriminate if done during migrations, and is almost exclusively of females during the breeding season, while every mother seal then killed means a young seal starved ashore. The largest of these "rookeries" is on the Pribilof Islands in Bering Sea, where the Russian-American Company carried on sealing till their cession to the United States in 1867, when it was taking some 40,000 seals a year; the herd being protected by restrictive regulations. In 1821 Alexander I. issued a ukase claiming Bering Sea as Russian property, and forbidding trespass on pain of confiscation; but the United States and Great Britain protested so vigorously that the claim was dropped. After the cession, the rivalry of competing companies would speedily have made an end of the seals in the Northern Ocean, as it long since had in the Southern, had not the United States leased the islands for 20 years to the Alaska Commercial Company (which then leased the Russian seal-islands also) for \$55,000 a year and \$2 62½ a skin, restricting the catch to 100,000 a year. In fact the company kept a little under that mark; but the contract was so profitable that vessels were soon fitting out from British Columbia, Hawaii, and Australia, which intercepted the seals as they passed between the Aleutian Islands northward or southward, or entered Bering Sea and caught the females as they ranged the seas for food. The poaching grew in volume, and a stream of protest from the Alaska Company flowed in year after year to the government at Washington, which in 1881 was goaded into officially reversing its former contention, and declared Bering Sea east of the treaty meridian of 1867 American waters; but took no further step till 1886, when under President Cleveland it seized and condemned three Canadian sealers. Great Britain protested, and proceedings were suspended pending discussion; but in 1887 five more were seized, and the question at once became a burning one in our diplomacy. Secretary Bayard attempted to convene delegates from Great Britain, France, Germany, Sweden, Russia, and Japan, to meet with our own and frame regulations to prevent the extirpation of the northern seals; but in June 1888 Great Britain withdrew, under pressure from Canada. In 1889 several more Canadian vessels were seized, and Great Britain sent a practical menace of war if this were not stopped. There being but three alternatives, abandonment of the sealing interest to destruction, which the country would not endure; seizure of all poaching sealers, which meant war; and arbitration—the latter was decided on in 1890. The same year the Alaska Company, its lease expired, was succeeded by the North American Company; the herd, estimated in 1867 at over 3,000,000 on the Pribilof Islands, had shrunk so enormously under the pelagic sealing that the price had risen from \$2 50 to \$30 per skin, and the new company's limit of capture was restricted to 20,000, with a royalty

BERING STRAIT—BERINGTON

of \$10 a skin. On 15 June 1891 a *modus vivendi* was agreed on for joint policing of Bering Sea by British and American vessels; and on 29 Feb. 1892 a treaty of arbitration was signed, under which on 23 March 1893 a tribunal met at Paris, composed of Baron de Courcel (France), Marquis Emilio Visconti-Venosti (Italy), Judge Gregers W. W. Gram (Sweden-Norway), Lord Hannan (England), Sir John S. D. Thompson (Canada), Justice John M. Harlan, and Senator John T. Morgan (United States). The United States case was conducted by the secretary of state (John W. Foster); counsel, Edward J. Phelps, James C. Carter, Frederick R. Coudert, and Henry Blodget. The decision on the legal points was entirely against the United States; Bering Sea was held part of the high seas and no one's preserve, and seals *feræ naturæ* and no one's property. But on the point of equity in our case, that the preservation of the seals from extinction was a common interest of the civilized world, it agreed with us, and framed regulations binding for five years to prohibit all pelagic sealing within 60 miles of the Pribiloffs, or from 1 May to 31 July in the North Pacific east of 180° or north of 35°, with other regulations. The restrictions proved absurdly ineffective, and Great Britain would not antagonize Canada to make them less so, in 1894 the pelagic catch was the enormous one of 142,000, far beyond any former record, and for several more seasons was very great, till the herds showed signs of rapid exhaustion. Great Britain obstinately refused to make any change in the regulations till the five years were up, sent an expert to the spot who laid all the blame on the North American Company, and refused to send a delegate to meet those of Russia, Japan, and the United States, who agreed to prohibit pelagic sealing to their subjects if Great Britain would do so. Meantime, to put pressure on the latter, Congress prohibited the importation of all sealskins except the North American Company's, in order to destroy the market for Canadian-caught skins and make their business unprofitable; but England still refused to agree to the provisional treaty, on the ground that it would injure Canada, was not necessary to protect the seals, and that the North American Company was solely in fault. But on 18 Nov. 1897 a joint meeting of English, American, and Canadian experts was held, and unanimously supported the American contention at every point; that the herds had diminished by from 66½ to 80 per cent, and markedly so even from 1896 to 1897; that the North American Company was handling its business with entire propriety; that pelagic sealing, involving the killing off of the females, was the sole cause of the reduction, which was threatening the entire extinction of the fur seal. Another year would bring about the time for changing the Paris regulations; and the United States agreed to prohibit all seal killing even on the Pribiloffs for a year, but Canada would not consent because it would scatter the crews of her sealing fleet. Meantime, Congress on 14 June 1898 appropriated \$473,151.26 to pay for the Canadian vessels seized years before. On 30 May 1898, a joint Canadian and American commission was authorized; it met at Quebec in August, adjourned to November at Washington, continued till February 1899, adjourned to the summer, and never reassembled. Most un-

fortunately, its scope included all the questions at issue between the two governments: the sealing problem became entangled at the outset with impossible bargains for general commercial reciprocity, then with the Alaska boundary question (q.v.) made acute by the Klondike gold discoveries, and at the adjournment not a single issue before it had been decided. The Paris regulations had expired, no new ones had been established, and the seals were left wholly without protection; while even so, as the United States forbade pelagic sealing to its citizens while England did not, all the profit of the perishing industry was being reaped by foreigners. The Canadian fleet of 1899 numbered 26 vessels, that of 1900 numbered 33, with a catch of over 35,000 each year, considerably more than half females. The same conditions have prevailed since; the North American Company has been increasing its efforts in order to obtain its share while the seals last; and in the Congressional session of 1901-2 it was seriously proposed to kill off the entire herd at once, and thus end the question by putting an end to the seals. (The latest work on this subject is the chapter in Henderson's 'American Diplomatic Questions,' 1901; earlier aspects were discussed in Stanton's 'Bering Sea Controversy' 1892.) See U. S.—DIPLOMACY OF THE.

Bering Strait and Island. The strait is the channel that separates Asia from America, and connects the North Pacific with the Arctic Ocean. Its breadth at the narrowest part, between Cape Prince of Wales on the American coast and East Cape in Asia, is about 36 miles, and its depth in the middle varies from 29 to 30 fathoms. On both sides are several commodious bays; but the country is barren and rocky, with scanty vegetation. The sea here is frozen over every winter, and foggy, hazy weather is almost perpetual. Whales frequent the strait, and the walrus occurs in vast numbers. The inhabitants on either shore support themselves chiefly by hunting and fishing; but those on the Asiatic side are greatly superior, both physically and intellectually, to those on the American. The strait is called after Vitus Bering, by whom it was first discovered. It was more fully explored by Capt Cook in 1778. **BERING ISLAND** is in the southwest part of the above sea, off the east coast of Kamchatka. It is uninhabited, and is without wood. It has, however, several springs of excellent water. Here the navigator Bering died in 1741.

Ber'ington, Joseph, English Roman Catholic theologian: b Shropshire, 1744; d Berkshire, 1 Dec 1827. His first work was 'A Letter on Materialism, and Hartley's Theory of the Human Mind' (1776). About this time, the English Roman Catholics found their position much stronger in the arena of public opinion, and began to think of appearing there openly. Berington, in 1779, published a letter to Fordyce, on his 'Sermon against Popery.' In 1780 appeared his 'State and Behavior of English Catholics from the Reformation till 1780.' In 1786 he came forward with 'An Address to the Protestant Dissenters,' who had lately petitioned for a repeal of the corporation and test acts. In 1787 appeared the 'History of Abelard and Heloise,' with their genuine letters, and 'An Exposition of Roman Catholic Principles, in reference to God and the Country,' and other

BERIOT — BERKELEY

pamphlets. In 1790, Berington gave to the world a 'History of Henry II.' (of England), vindicating the character of Becket from Lord Lyttleton's attacks. In 1793 appeared his 'Memoirs of Gregorio Panzani,' papal legate to England in 1634-6, translated from the Italian. But his most important work appeared in 1814, a 'Literary History of the Middle Ages,' giving an account of the state of learning from 'the close of the reign of Augustus to its revival in the 15th century.'

Beriot, bâ-rê-ô, Charles Auguste de, Belgian violinist: b. Louvain 20 Feb. 1802; d. there 20 April 1870. He studied with Robbrecht and Tiby, and, in Paris, with Baillot; and became a professor in the Conservatory in Brussels in 1842. In 1836 he married the celebrated singer, Malibran. He published a 'Violin Method' (1858).

Berislav, bâ-rê-slaf, or Borislav, Russia, a fortified town on the Dnieper River. It is the centre of trade for the district. Pop. (1903) 13,700.

Berkeley, George, English philosopher and bishop: b. Kilmrm, Ireland, 12 March 1685; d. Oxford, 14 Jan. 1753. He was educated at Trinity College, Dublin, where he took a keen interest in the philosophical problems then under discussion. He received the degree of A.B. with honors in 1704, being afterward successively scholar and fellow. Almost immediately he began his career of authorship. He published in 1709 his first important work, the 'New Theory of Vision,' which is the logical preliminary to his system and gives expression to certain of its fundamental principles. A year later his philosophy finds complete statement in the 'Treatise Concerning the Principles of Human Knowledge.' During the next 15 years Berkeley advanced to a position of prominence in the English Church. In 1711, shortly after his ordination to the diaconate, he published his 'Discourse on Passive Obedience,' a treatise upon ethics, in which he develops a system of theological utilitarianism. The 'Dialogues,' published in 1711, present his philosophy in literary form, clothing subtle argument in a garb of rhetorical beauty. In the years immediately following, several new works appeared, accompanied by increasing fame and prosperity. He was appointed successively to the deaneries of Dromore and of Derry, the latter of which yielded a large income. But this he resigned in order to devote himself to a plan for the establishment of a college in the Bermudas, where the Indians of America were to be enlightened and Christianized. For the furtherance of such a plan he obtained a promise from the government for a grant of £20,000. Upon the strength of this he sailed for America in 1728, accompanied by his wife and a few friends. They went first to Rhode Island, where they planned to await the expected grant. Here Berkeley purchased a farm and waited three years in quiet and study. Finally, upon the failure of the government to make good its promise, he was compelled to give up his cherished plan and return to England in 1731. Soon after his return he was made Bishop of Cloyne. During the remaining years of his life he published a number of works upon philosophy, economics, and other subjects. Notable among these were 'Alciphron, or the Minute Philoso-

pher,' the result of his quiet studies in Rhode Island, and 'Sirius,' a remarkable essay in which the author interweaves his convictions concerning the healing properties of tar-water with the deepest and most profound of his philosophic reflections.

Although the representative English idealist, Berkeley proceeds in his thought from the empirical philosophy of Locke. It was Locke's contention that in knowledge we are concerned with our own ideas only, and that these ideas are derived entirely from experience. He made an important distinction among these ideas, however, with reference to their representation of objective or material reality. Ideas of color, sound, taste, etc., called secondary qualities, are subjective processes, and reveal nothing of the nature of material reality. But ideas of extension, figure, motion, etc., called primary qualities, reveal directly the nature and constitution of that reality which exists without the mind in the material world. Berkeley agreed with Locke that we know only our own ideas, but he attacked vigorously this distinction between primary and secondary qualities. He maintained that ideas of primary qualities are wholly subjective, and tell us no more of the nature of material reality than do our ideas of secondary qualities. He attempts a partial proof of this in his 'New Theory of Vision,' by showing that distance, magnitude, and situation, are not directly perceived by sight, but are inferred in an indirect manner. These ideas of distance, magnitude, and situation are results of judgment based upon visual sensations. Such visual sensations have no essential relation to the ideas in question, however—they are simply associated with them in experience. For example, consider our idea of distance. We find connected with this idea: (1) Sensation of movement in the eye; (2) confusion in vision due to nearness of the object; and (3) strain of fixation. These sensations are associated by custom with degrees of distance. Hence we have in this idea of distance no direct revelation through vision of the nature of material reality. Rather we have the product of our own judgment, based upon sensations which have themselves no objective reference. So it is with other ideas of primary qualities which have been held to bring us into immediate contact with material reality. In ideas of figure and motion we have sensations of light, color, and strain, and the remainder is due to association and judgment. Thus Berkeley concludes that we have in visual ideas not a revelation of the nature of matter, but a universal language of symbols whereby we interpret our sensations of touch, and so regulate our actions as to preserve and promote our lives. In his 'Treatise Concerning the Principles of Human Knowledge,' he uses this conclusion to disprove the existence of a material world apart from, and independent of, the perceiving mind. The very notion of matter or corporeal substance involves insoluble contradiction. By matter is meant inert, senseless substance in which extension, figure, and motion reside. But these so-called attributes of matter are ideas in the mind, and are shown to be every whit as subjective as ideas of colors and tastes. Now, ideas can be similar only to ideas. Hence to suppose that our ideas copy or represent a material substance that is unperceiving and

BERKELEY

unperceived, is a crass absurdity. Ideas are the only objects of our thought. To exist as an object is to be perceived. (*Esse est percipi.*) Although confined to our own ideas, we may observe their various characteristics and combinations. Sense qualities are simple states of consciousness. Sense-objects are sensation-complexes. There is in our consciousness a continuous succession of these perceptions, in which we perceive perceptions newly excited, perceptions changed, and perceptions obliterated. For all this phenomena there must be some cause. This cause cannot be an idea or combination of ideas; for it is the appearance and arrangement of ideas which must be explained. This cause must be a substance, a ground of existence. Matter, or corporeal substance, is an impossibility. We are compelled, therefore, to find the cause of our ideas in an incorporeal, active substance, or spirit. But we observe an important difference in the production of our ideas. Those ideas actually perceived by the senses of the individual are not dependent upon his own mind or will. Hence there must be some other will or spirit which produces them. This is God, the Author of Nature. The ideas of sense are imprinted upon our minds by the direct influence of the Divine Mind. Hence they are strong, orderly, and coherent. Their source guarantees their trustworthiness, and with good reason they may be called "real things." In this way our knowledge acquires an objective validity much more adequate than if our ideas were aroused by the action of a material substance upon our sense-organs. The laws of nature, which we properly regard, represent the regular operation of the Divine Mind upon our minds. There is consequently no difficulty in distinguishing the order of ideas which is real and objective, from the train of subjective fancies and imaginations.

The best edition of Berkeley's works is that by Fraser (2d ed. 1902), containing a 'Life.' Consult further: Fraser's briefer 'Life' (1881; new ed. 1901; in 'Philosophical Classics'); Frederichs, 'Ueber Berkeleys Idealismus' (1870); Spicker, 'Kant, Hume und Berkeley' (1875); Janitsch, 'Kants Urtheil uber Berkeley' (1879).

H. W. WRIGHT,
Cornell University.

Berkeley, George Charles Grantley Fitzhardinge, English writer: b. 10 Feb. 1800; d. Poole, Dorsetshire, 23 Feb. 1881. In 1832-52 he was a member of the British Parliament, and for a time he was in the army. His 'My Life and Recollections' (1864-6), an extensive work, attracted some attention. Among his further works are: 'Berkeley Castle' (1836); 'Sandron Hall, or the Days of Queen Anne' (1840); 'The English Sportsman on the Western Prairies' (1861); 'Anecdotes of the Upper Ten Thousand at Home and Abroad' (1867); and 'Tales of Life and Death' (1870).

Berkeley, Sir George, English engineer: b. London 26 April 1821; d. there 20 Dec. 1893. In 1835 he began experimenting with methods for operating atmospheric railways. In 1841 he associated himself with Robert Stephenson and continued his experiments. On Stephenson's death he became engineer of the Great Indian Peninsular Railway. In 1892 he was made president of the Institute of Civil Engineers. He wrote papers on atmospheric rail-

ways and on the strength of iron and steel; and was knighted in 1893.

Berkeley, Sir John, English nobleman, one of the proprietors of New Jersey: b. 1607; d. 28 Aug. 1678. He was a prominent Royalist during the contest of Charles I. with Parliament. Charles II. granted him, with Sir George Cartaret, a proprietary interest in New Jersey and Carolina.

Berkeley, Miles Joseph, English botanist: b. Biggin, Derbyshire, 1803; d. Sibbertoft, Leicestershire, July 1889. Educated at Christ Church, Oxford, he took orders, was curate at Margate (Kent) and Market Harborough (Leicestershire), and subsequently was made vicar of Sibbertoft. He soon became the leading British authority on fungi and plant pathology, and especially well known for his achievements in mycology. About 6,000 species of fungi are credited to him; his most important work was the section on fungi contributed to Hooker's 'British Flora' (1836), and his 'Outlines of British Fungology' (1860), and he assembled a fine herbarium of more than 9,000 species, now at the Kew Gardens, and regarded as one of the most noteworthy in the world. A bibliography may be found in the 'Catalogue of Scientific Papers' of the Royal Society. Consult, also, Vol. XLVII. (1890) of the 'Proceedings of the Royal Society' for a sketch by Hooker.

Berkeley, Stanley, English artist. He has constantly exhibited at the Royal Academy in recent years, and is a national gold medallist and a member of the Royal Institute of Painter Etchers. Among his paintings are 'The Victory of Candahar'; 'For God and the King'; 'Prince Rupert at the Battle of Edgehill'; 'Completely Routed'; 'An Australian Bush Fire'; 'Heroes of the Tugela'; 'The Meet'; 'Atbara'; 'Omdurman'; 'The Charge of Scarlett's Three Hundred'; 'Gordons and Greys to the Front'; 'Full Cry'; 'Desperate Odds'; 'Dargai'; 'Cornered at Last'; 'The Death'; 'The Charge of the French Cuirassiers at Waterloo.' He has also done much in the way of illustrating books and newspapers.

Berkeley, Sir William, American colonial governor: b. near London about 1610; d. 13 July 1677. His father and brother were colonial proprietors. Graduating from Oxford 1629, he traveled on the Continent for a year; was appointed a commissioner of Canada 1632, and won a high reputation there. In 1641 he was made governor of Virginia, and arriving in 1642, was for a time very popular. He experimented in the cultivation of rice, cotton, indigo, hemp, flax, and silk, the manufacture of potash and naval stores, and the cutting and export of masts; pleased the Royalist party by expelling the New England Puritans in 1643, and all parties by capturing the Indian chief Opechancanough in 1644, after a series of Indian massacres. Always with an eye to profit, however, he received from the king a monopoly of the ice trade. During the English revolution he adhered to the royal side, and offered an asylum in Virginia to exiled or dissatisfied Royalists; many hundreds availed themselves of this. When Cromwell felt strong enough he sent a fleet (in 1651) to bring him back for punish-

BERKELEY — BERKHAMPSTEAD

ment; but Berkeley succeeded in making terms with it by mingled "bluff" and finesse, and was allowed to retire in safety to his plantation, though deprived of his office. When the Restoration began to seem probable, the colonists elected Berkeley as governor to gain favor in such event; Berkeley accepted it provisionally, and Charles II. on accession confirmed it. But in this second term all Berkeley's evil side showed itself, till it ended in the atrocities of 1676. Besides expelling and confiscating the goods of Puritans and Quakers, a measure popular at the time, he frowned on the establishment of schools, and absolutely refused to have a printing-press set up, as making people too censorious of their superiors. He formed a council of the wealthier planters, and having obtained during the spasm of Restoration loyalty in 1662 an ultra-royalist House of Burgesses, would not issue writs for another election for 14 years, simply adjourning annually the "Long Assembly," as it came to be called; and in 1670 abolished universal suffrage, substituting a property qualification, purely as a precaution for the future, as no elections were held for years before and after. These, however, were only means to the end of profiting himself and his friends, and the rapacious crew of civil officers sent over by Charles to quiet their importunities. The heavy taxes and fees imposed on the colony, drove them to desperation, so that as early as 1667 they were ripe for revolt. Besides Berkeley's share in various extortions, he had one monopoly which led directly to the catastrophe, that of the Indian trade, which he gained by underhand means. The colony allowed no trade with the Indians without license; Berkeley therefore licensed a small number of men to trade in furs with them, which secretly included liquor, firearms, and other things, and exacted a third of the profits. It was believed to be this gain which led him to refuse permission to the colonists to protect themselves against the Indians in 1675-6, while hundreds of them were being massacred and tortured and scores of plantations laid waste, and to dissolve force after force assembled to protect them. How Nathaniel Bacon chastised the Indians in spite of him, was proscribed for it, forced into open rebellion, drove Berkeley into retreat and burned his capital, and died at the moment of his victory, is told under 'Bacon's Rebellion.' Berkeley's soul was as full of senile fury as it had been of senile avarice; he slaughtered right and left, hanging a score of victims with such vindictive haste and ruffianly insult that the Assembly remonstrated, and the royal commissioners, who came in January to investigate the condition of the colony, made a report that led the king to remove him, with the comment, "The old fool has put to death more people in that naked country than I for the murder of my father." He sailed 27 April, his departure celebrated with bonfires and salutes of cannon; and expected to justify himself to the king and return. But Charles kept postponing an interview, and in a few weeks Berkeley died—of chagrin, it was believed.

Berkeley, Cal., a town in Alameda County, on the Southern P. R.R.; 8 miles northeast of San Francisco. It is the seat of the State University of California (q.v.); the State Agricultural College; the State Institution for the Deaf,

Dumb, and Blind; and six college preparatory schools. The town is well equipped with electric light and street railroads; and has soap works, iron foundries and machine shops, furniture factory, and other industries. Pop. (1900) 13,214.

Berkeley, England, a market town, 16 miles southwest of Gloucester, pleasantly situated on the right bank of the Avon, in the rich vale of Berkeley, and celebrated for its castle, where Edward II. was confined and barbarously murdered. Pop. (1901) 6,277.

Berkeley Divinity School, an Episcopal theological school at Middletown, Conn. It was organized by Bishop John Williams of Connecticut while he was president of Trinity College, at Hartford, and was at first intended to be the theological department of the college. It was later placed upon an independent basis and removed to its present location. The value of its buildings is about \$50,000, and its endowment fund is not far from \$350,000.

Berkeley Sound, next to Stanley Sound the most frequented inlet of the East Falkland Island, near its northeast extremity. Though it is difficult to enter, it contains some of the best harbors in the South Atlantic.

Berkeley Springs, W. Va., a town and county-seat of Morgan County; 2 miles south of the Potomac and 77 miles northwest of Washington; on a branch of the Baltimore & O. R.R. It is in an agricultural region, and has been widely known and popular for more than a century because of its mineral springs. The site of the town was a part of the vast estate of Lord Fairfax, and Washington owned considerable property here. It is the oldest pleasure resort in the South, and as far back as the colonial days the gentry of Virginia came here in warm weather and lived in log huts in order to enjoy or be benefited by the baths and swimming pools. Pop. (1900) 781.

Berk'enhout, John, Dutch-English physician and general writer. b. Leeds, about 1730; d. 1791. Having entered the Prussian service, he rose to the rank of captain. In 1756 he quitted that service and entered into that of England, where he obtained the same rank. At the peace in 1760 he went to Edinburgh and began the study of physic; while there he published his 'Clavis Anglica Linguae Botanicae,' a book of great merit, and later his 'Pharmacopœia Medici,' which passed through three editions. In 1778 he attended the British commissioners to America, and at Philadelphia he was committed to prison, but he soon afterward was set at liberty, and returned with the commissioners to England, where he obtained a pension. He was an industrious writer, and his publications possess considerable merit.

Berkhampstead, berk'hām-stēd, or **Berkhamsted, Great**, a town in Hertfordshire, England, beautifully situated in a hollow, surrounded by hills, on the London & N. W. R.R. It consists almost wholly of one main street, and has a fine old church, restored 1871-87; several chapels; Berkhamsted School, with a fine chapel (1895); a high school for girls; many other schools; etc. There are works for wooden ware, a large chemical work, a boat-building yard, brush, coach, and mantle factories, an iron foundry, etc. The poet Cowper

was born here in 1731. In the small parish of Little Berkhamstead, some miles to the north, the famous Bishop Ken was born. Pop. (1891) 5,034.

Berkhey, bĕrk'hî, **Johannes Lefranca van**, Dutch writer of eminence: b. Leyden, 23 Jan. 1729; d. there, 13 March 1812. His work, entitled 'Natuurlyke Historie van Holland,' first brought him into notice. He also distinguished himself as a poet, though he often manifests a tendency to bombast, and indulges in false pathos. One of his best poems is entitled 'Het Verheerlykt Leyden.'

Berkley, Va., a town in Norfolk County on the Elizabeth River opposite the city of Norfolk. It is on the Norfolk & W. and the Norfolk & S. R.R.'s. The Berkley College and Military Institute and several private schools are located here. Shipyards, foundries, and knitting-mills are also among the features of the town. Pop. (1900) 4,988.

Berkshire, a midland county of England, with an area of 450,132 acres or 712 square miles. Its shape is very irregular, and has been compared to that of a shoe or slipper. A range of chalk hills crosses the country in a westerly direction, and forms a boundary to the fertile vale of Whitehorse, so called from the gigantic form of a horse which has been scooped out on the side of a chalk hill, so as to become conspicuous to all the country round, referred to in Thomas Hughes' 'The Scouring of the White Horse.' The cultivated parts of the county, and more especially this vale, are peculiarly fruitful in barley. They also contain much rich pasturage and many excellent dairy farms. Timber abounds, particularly oak and beech, in Windsor Forest and toward the west. Turnips are an important crop. There are but few manufactures carried on in this county, the principal being agricultural implements and artificial manures, flour, paper, sacking and sail-cloth, and biscuits (at Reading). Malt is made in great quantities, and chiefly sent to London. The principal towns of Berkshire are Reading (the county town), Newbury, Maidenhead, Wokingham, Wallingford, Windsor, Abingdon, Wantage, and Farringdon. Pop. (1901) 255,000. See Graves, 'The Way About Berkshire' (1898).

Berkshires, **The**, or **Berkshire Hills**, a range of mountains in the northwest of Massachusetts; in Berkshire County; stretching 16 miles north and south on the east of the valley of the Upper Hoosic River. They are a favorite summer and autumn resort. The highest summits are Greylock in the north, 3,535 feet, and Mount Everett, or the Dome, in the south, 2,635 feet.

Berlad, bĕr-lăd', Rumania, a town on the Berlad River, and Teucuci-Baslui R.R., about 68 miles northwest of Bucharest. It is the trade centre of a grain-raising district and has many distilleries. It is a well built town, with good schools and a theatre. Pop. (1903) 26,892.

Berleburg, bĕr'lĕ-boorg, or **Berleburger Bible**, a translation of the Scriptures published at Berleburg, Germany (1726-42). Its unknown editors have given an original version with accompanying exposition more or less mystical in character.

Berlichingen, bĕr'lîŋ-îng-ĕn, **Götz**, or **Godfrey von**, German soldier of fortune: b. Jax-

thausen, Swabia 1480; d. 23 July 1562. He was a bold, restless, warlike, and honorable knight. He placed himself at the head of a body of the rebellious peasants, in the war which they waged against their oppressors, but was soon made prisoner. Before that time he had lost his right hand, and therefore wore one made of iron. His biography, written by himself, was printed at Nuremberg in 1731 and 1775, and, for the third time, at Breslau in 1813. This book contains an excellent picture of the social life and customs of the time, and has furnished Goethe with the subject of his drama, 'Goetz von Berlichingen,' translated by Sir Walter Scott.

Berlin, Canada, town and county-seat of Waterloo County, Ont.; on the Grand R. and the Grand T. R.R.; 62 miles west of Toronto. It has manufactories of furniture, leather, boots and shoes, pianos and organs, buttons, gloves, etc.; excellent sewerage system, waterworks, street railway, and gas and electric light plants; a Roman Catholic college, 15 churches, and several daily, weekly, and monthly periodicals. Pop. (1901) 9,747.

Berlin, ber-lîn', or bĕr-lĕn', the capital of the kingdom of Prussia and of the German empire, and centre of the Prussian province of Brandenburg, but separated from it by a law of 30 July 1883, and forming an administrative community by itself. Next to London and Paris, it is the greatest city of Europe. It is situated in lat 52° 30' 16" N; lon. 13° 23' 43" E; on the river Spree, an affluent of the Havel, tributary to the Elbe. The natural waterway of the Spree which divides into several arms and receives the Panke coming from the north, determines the division of the city; the centre consists of Old Berlin, Old Kolln, and New Kolln, and the Friedrichswerder.

Old Berlin, along the Konigstrasse, one of the liveliest streets of Berlin, has been beautified considerably by the demolition of the complex jumble of unsanitary old houses on the Muhlen-damm. The principal arm of the Spree has been made navigable for Elbe ships at an expense of \$2,640,000 and thus connects Berlin through the Oder-Elbe-Spree Canal with every section of the eastern monarchy. The most impressive building of Old Berlin is the Rathaus, or city hall. Old Kolln, stretched out between the two arms of the Spree, is a commercial centre on the southern side; in the north it is adorned by the Schloss or royal castle, the magnificent museum and the National Gallery. New Kolln and Friedrichswerder, to the north, connect Old Kolln with the Dorotheenstadt and Friedrichstadt, with the Hall of Fame, the Palace of the Crown Prince, the State Bank, and the Werder Church. This centre of the ancient city is surrounded by a concentric circle of seven quarters: the aforementioned Dorotheenstadt and Friedrichstadt, the Friedrich-Wilhelm-Stadt separated from the Spandauer Viertel (quarter), the most populous quarter of the city, by the prolongation of the Friedrichstrasse, the longest street of Berlin. The Konigstadt stretches eastward; the Stralauer Viertel reaching from the Schillingsbridge to the Landsberger Gate, is again connected with the Friedrichstadt through the Luisenstadt on the left bank of the Spree. These seven sections are again encompassed by the extensive Wedding, the Oranienburg, and

BERLIN

Rosenthal suburbs in the north, Moabit in the northwest, the fine, far-famed Tiergarten (zoological garden) in the west, the Friedrichsvorstadt (suburb), the Schöneberger and Tempelhofer Viertel in the south. These vast sections, some of which are large cities in themselves, are traversed by more than 700 streets (strassen) with a total length of over 310 miles, which again connect Berlin with every highway of the empire, making it, as it were, the heart where the national arteries converge. The Friedrichstrasse, nearly two miles long, traverses the city from the Oranienburger Gate in the north to the Belle Alliance Square in the south. It is crossed by the famous street, Unter den Linden (three fifths of a mile long and nearly 150 feet wide, and so called after its four rows of trees, principally lindens), studded with magnificent public and private buildings, as the Imperial Palace, opposite the university, once the palace of Prince Henry, brother of Frederick the Great, the Ministry of Cult and Public Instruction, several embassies, first-rate hotels, the famous Café Bauer, etc. Behrenstrasse has a great number of the foremost banking buildings, mostly in Renaissance style. Leipzigerstrasse is perhaps the most beautiful in Berlin, with many brilliant stores, the new Herrenhaus (house of lords), the war ministry, Imperial general post-office, etc. In Wilhelmstrasse, almost parallel to Friedrichstrasse, we find in the north the palace of the imperial chancellor, where so much of modern history was made, several ministries and embassies, the palace of the late Prince George, etc. The richest private palaces and villas are found in the Tiergarten quarter in the west. The various quarters of the city intersected by the channels of the Spree are connected by over 50 bridges, which, however, are not distinguished by magnitude or architectural beauty. Only the Schlossbrücke, built after Schinkel's plans in 1822-4, upon two massive stone arches, to connect the Unter den Linden and the Lustgarten (pleasure garden), is adorned with eight allegorical marble groups of heroic size, sculptured by Blaser, Drake, etc., and representing the life of warriors under the ægis of Athene and Nike (Victory). The Kurfürstenbrücke, named after the great elector, built 1602-6, and connecting the large square before the Royal Castle with the Königstrasse, is adorned by the famous equestrian statue of the Great Elector; it was modeled by Schlüter, unveiled in 1703, and supported by a new marble pedestal in 1896. Great efforts have been made recently, under the present art-loving emperor, to adorn other bridges with artistic figures of Begas, Piper, Herter, etc. There are 72 public squares distributed throughout the city, some of which are surrounded by magnificent buildings and ornamented with monuments, statues, fountains, and gardens. The Opera Square, between the Opera House, built by Frederick the Great, the Imperial Palace, and the Royal Library, the Roman Catholic St. Hedwig's Church, and the university is adorned with five statues of Prussian generals by the great sculptor, Rauch. The Pariser Square, on the west end of the Linden, and the Königsplatz, with the Siegesdenkmal (Monument of Victory), the Parliament building, and the Royal Opera Theatre (Kroll) are perhaps the grandest in Ber-

lin. The Leipziger Square, with several monumental state buildings; the Potsdamer Square, with the great Potsdam Railroad station; the Ascanian Square, with the Anhalt railroad station; the Belle Alliance Square, with the Peace Column; the old and far-famed Lustgarten, between the Old Museum, the new Cathedral, and the Royal Castle—have all their distinguishing characteristics and unique features of local color and artistic originality.

A number of vast public parks scattered throughout the capital, afford breathing-places for the population, which is now verging on 2,000,000. The foremost and finest is the Tiergarten, which stretches from the entrance to the Linden (Brandenburger Gate), up to the city of Charlottenburg. Originally a game preserve for the electors of Brandenburg, since the time of Frederick, the first king of Prussia, it has been gradually turned into a park. It is extremely well cultivated, traversed by shady roads and alleys of old trees; there are charming walks, lawns, play-spaces for children, fountains, small lakes, and bridges. The crowding of hundreds of statues, however, detracts from the natural aspect of the park. There are marble statues of Frederick William III and Queen Louise; of Goethe, with the allegories of lyric and tragic poetry, by Schaper; of Lessing, with the genui of humanity and critique, by O. Lessing; and busts of the great composers, Haydn, Mozart, and Beethoven. Emperor William II. has, since 1898, filled the Tiergarten with marble statues of all the Hohenzollern ancestors of Brandenburg-Prussia, and their most eminent paladins. The Friedrichshain (grove) in the northeast, the Humboldthain in the north, the Zoological Park in the west, and the Botanical Garden in Schöneberg, with its splendid palm-house and 36 green-houses and hot-houses, complete the list of free spaces for public recreation.

Monumental Buildings and Monuments.—The street, Unter den Linden, is entered from the Tiergarten by the Brandenburg Gate, a monumental gateway which survived the destruction of 19 of its fellows, which were demolished in 1867-8 with the city walls, which had been built up gradually between 1743 and 1802. It is a creation of Langhaus, 1780-93, and is modeled after the Propylæa of Athens. It is formed by a double portico of six Doric columns each, between which five passageways (of which the central one is the widest) furnish ample space for passing vehicles. Upon the columns rests a Roman entablature, surmounted by an attic, which carries a bronze quadriga of Victory. This emblematic chariot was taken to Paris by Napoleon after his crushing victory at Jena and Auerstadt, but was brought back in 1814. The gate is flanked by two Doric colonnades representing temples.

The oldest monumental building in Berlin is the Royal Castle (Schloss), a rectangle of 650 feet by 380 feet. The front façade is four stories high; the dome rises to a height of 215 feet. The original building, which still exists, on the Spree side, was a towered castle built by Elector Frederick II. in 1451; additional structures were built from time to time until the famous architects Schlüter and Eosander, under the first king of Prussia in 1699, transformed the irregular parts into one harmonious building. The domed chapel above the portal,

and Vicinity



BERLIN

and the terrace toward the Lustgarten, were built by Stüler and Schadow, 1845-52. The present imperial family resides in this castle, which contains, besides the throne hall, the picture gallery, the renovated white hall, around which hover many legends of the Hohenzollern house, the chapel, many chambers for royal guests, etc. It contains also the great military pictures of Menzel, Werner, Bleibtreu, etc., commemorating the glories of the modern empire.

The palace of William I., on Opera Square, serves at present as the residence of Prince Henry; close to it is the Royal Library; eastward the palace inhabited successively by Frederick III., and, after his death, by his empress. Opposite stands the arsenal, now a military museum and Hall of Fame, a rectangular structure, 295 feet square, with a large central glass-covered court, built between 1695 and 1706 by Nering, Schluter, and Bode, in late Italian Renaissance style. It contains a great exhibition of arms, especially of the evolution of artillery, and many battle trophies; bronze statues of Prussian rulers; admirable mural paintings of military and historical subjects by Bleibtreu, Werner, allegories by Gesellschaft, and a marble Victoria by Schaper. On the outside are fine sculptures by Schluter, which represent heads of dying warriors. Appropriately close is the main guard-house in the form of a Roman *castrum*, built by the genius of Schinkel, who also blended Renaissance forms and Greek characteristics in the Royal Theatre (Schauspielhaus), and the Academy of Architecture.

Opposite the Schloss on the Lustgarten, rises the Old Museum, also built by Schinkel, 1825-30, in Greek style, perhaps the finest building in Berlin. Its façade is in the form of a Greek-Ionic portico, 284 feet long, with 18 columns. Corresponding to the interior rotunda, the roof is raised dome-like in the centre, there are four colossal bronze groups at the four corners, Horse-tamers and Pegasus with the Horæ. The walls are painted with wonderful allegorical frescoes representing the evolution of the world and of civilization. The exceedingly rich treasures of the Old Museum are stored in the Gallery of Antiquity, the Numismatic Cabinet with 200,000 coins and medallions; a picture gallery of about 1,300 works of art, especially Old Italian and Old Dutch of the 15th century. In the rear of, and connected with, the Old Museum by a highly artistic-roofed passageway, is the New Museum, built by Stüler, 1843-55, in Renaissance style, the centre of which encases the impressive marble staircase; the upper walls are adorned with Kaulbach's famous six mural paintings (1847-66) representing the chief phases of the history of the human race. The building contains a collection of casts, Egyptian antiquities, engravings of some 300,000 sheets, the antiquarium of ancient German treasures, 4,000 vases, terra-cottas, bronzes, etc.

Eastward from the New Museum, within a hall of Doric columns, stands the National Gallery, finished in 1876. It is built of sandstone as a Corinthian temple after Stüler's plan, and rises on a basement 39 feet high, an impressive double flight of stairs giving access to the portico. It contains over 700 paintings of modern artists, sculptures, and the valuable art collections of Count Raczynski.

In general, the immense wealth of scientific collections in Berlin is piled up, besides those aforementioned, in 10 or 12 other museums, of which the Ethnological, the Botanical, the Geological, and Mineralogical, the Provincial Museum of the Mark, the Museum for German Fashions, and the Industrial Museum are the most noteworthy. The Hohenzollern Museum is of the greatest historic and dynastic interest. The city hall, with its statues outside and its rich paintings inside; the Academy of Sciences; the admirable School of Technology in Charlottenburg, with rich sculptures and vast collections of engineering interest; the Exchange building (Borse); the mint; the Parliament buildings, etc., are also monumental works of architecture deserving of the closest study.

Among the numerous statues and monuments the equestrian statue of Frederick the Great, the masterwork of Rauch, unveiled in 1851, before the imperial palace, Unter den Linden, is the most beautiful and impressive monument, on the pedestal of which are the relief figures of the great king's famous contemporaries. In the midst of the Lustgarten stands the equestrian statue of Frederick William III., with seven allegorical figures on the pedestal. Other statues are those of Frederick William IV., on the staircase of the National Museum; and on the Museum-island the monument of Emperor Frederick III., by Maïson. Throughout all the squares and parks are scattered hundreds of more or less artistic statues of the great military leaders and men of letters who have made Germany famous in all pursuits of human activity. The imposing national monuments of Emperor William I. and Bismarck are the most recent creations of German art.

Two symbolic monuments of vast proportions and great artistic value must be mentioned. The Column of Peace, on Belle Alliance Square, was erected in 1840, in commemoration of the peace of 1815. Its capital is of marble, surmounted by a very graceful flying Victory. On the Königsplatz, in the Tiergarten, stands a monumental column of yellow sandstone supporting a colossal statue of Borussia; its total height is 200 feet. The capital of the column is formed of eagles, and the shaft is surrounded by cannon captured from the Danes, Austrians, and French. The pedestal is adorned with bronze reliefs of Duppel, Königgratz, and Sedan, and with portrayals of the returning fame-crowned troops. This Column of Victory was dedicated in 1873 in commemoration of the victories of 1864, 1866, and 1870-1.

Churches—The dearth of churches, by which Berlin was formerly unfavorably known, has been relieved during the last 15 years, owing to the efforts of the present emperor. Berlin has at present over 70 Protestant, 7 Roman Catholic churches, and 4 synagogues. More than one half of the Protestant churches were built during the reign of William II. The old cathedral (Domkirche) on the east side of the Lustgarten, begun 1747, completed in 1821 by Schluter, was demolished in 1894. A magnificent new cathedral was erected in its place, 1894-1902, in late Italian Renaissance style, after the plans of Raschdorff. Among the oldest churches are to be mentioned St. Nicholas Church of the 12th century, renovated in 1877; St. Mary's Church, on the New Market Square, where now stands a monument of Luther, and

BERLIN

the Gothic Cloister Church, both of the 13th century. In commemoration of his grandmother, Empress Augusta, William II. built Grace Church in the Invaliden Park in 1895. It is a Romanesque sandstone structure by Spitta. The Emperor William Commemoration Church (Gedachtniskirche) was built in 1895, by Schwechten, in late Romanesque style on the Kurfurstendamm, and in the same year by Vollmer, a Gothic sandstone church in memory of Frederick III. Two garrison churches, one Protestant by Rossteuscher, one Roman Catholic by Menken, were consecrated in 1897. A Gothic church of St. George, built by Raschdorff for the English colony, stands in the park of the royal castle, Monbijou. The first Roman Catholic Church is that of St. Hedwig on Opera Square, built 1747-73, decorated by Hasack. The synagogue in Oranienburgerstrasse, with a seating capacity of 3,000 persons, is magnificent. Begun in 1859, after Knoblauch's plans, as a Moorish structure, completed in 1866 under Stuler, it is one of the most monumental sacred buildings in Berlin. On the whole, however, it must be said that Berlin does not compare favorably with the other great European cities so far as its ecclesiastical monuments are concerned.

Population.—The growth of Berlin, of which the first documentary mention is made about the middle of the 13th century, has been remarkable under the fostering care of the Hohenzollern dynasty. Before the Thirty Years' war it had 12,000 inhabitants, but sank to 6,000 under the blasting horrors of that strife. It had 20,000 at the death of the Great Elector (1686); rose to 102,400 under Frederick William I.; 150,803 in 1790; but reached only 162,971 in 1810, owing to the French disaster. Since then the progress has been steady and increasingly rapid, being 322,620 in 1840; 448,610 in 1858; 824,580 in 1871; 1,122,330 in 1880; 1,578,794 in 1890; 1,884,151 in 1900; 1,901,567 in 1901. The transient influx of strangers to Berlin is enormous, amounting in 1896 to 717,986.

According to religious denominations, the Lutheran Reformed Church is by far the strongest. In 1895 there were 1,421,014 Lutherans and Protestants of all denominations; 154,970 Roman Catholics, and 86,152 Jews. There is a constant current of people from the provinces, and a foreign stream to and from Berlin, which, with the immigrations *en masse* from France, the Netherlands, and the Slavic East in former centuries, mixed the population to such an extent that credible statisticians assign about 35 per cent to the German, 36 per cent to the Latin, 24 per cent to the Slavic, and 5 per cent to the Jewish race. To this population must be added one entire army corps of Imperial Guards, a floating army mustered from the physically strongest youth of the whole nation, garrisoned in Berlin and the second royal residence at Potsdam.

Administration.—The government of the city is republican and autonomous. The city precinct (*Stadtkreis*) of Berlin is self-administrative, except that it shares with the province of Brandenburg a common chief president, and that the police president, under the minister of the interior, is a royal functionary. Otherwise the magistrates (34 members) and the municipal council (144 members) administer the affairs of the city. A chief-burgomaster and a

burgomaster (elected by the council for 12 years, though confirmed by the king), and their associates carry on the very complex machinery of the municipal business.

The city is divided into six elective districts for the Imperial Diet (*Reichstag*), where it is represented by four Socialists and two Radicals (1900); and into four elective districts for the Prussian House of Representatives (*Landtag*) with nine representatives, all of whom were Radicals in 1898.

Every male inhabitant of Berlin, after one year's residence, who is a German subject, 24 years old, not a pauper or criminal or under police surveillance, who has paid his taxes during the last year, is a property-holder or a tradesman, or who pays an income tax or a class tax, is a regular voter. Voters are divided into three classes according to the amount of their taxes, in this respect a true timocracy in the sense of Solon's institution at Athens. Thus the municipal councilors are elected in three classes for a term of six years, one third of the seats being vacated and filled every two years.

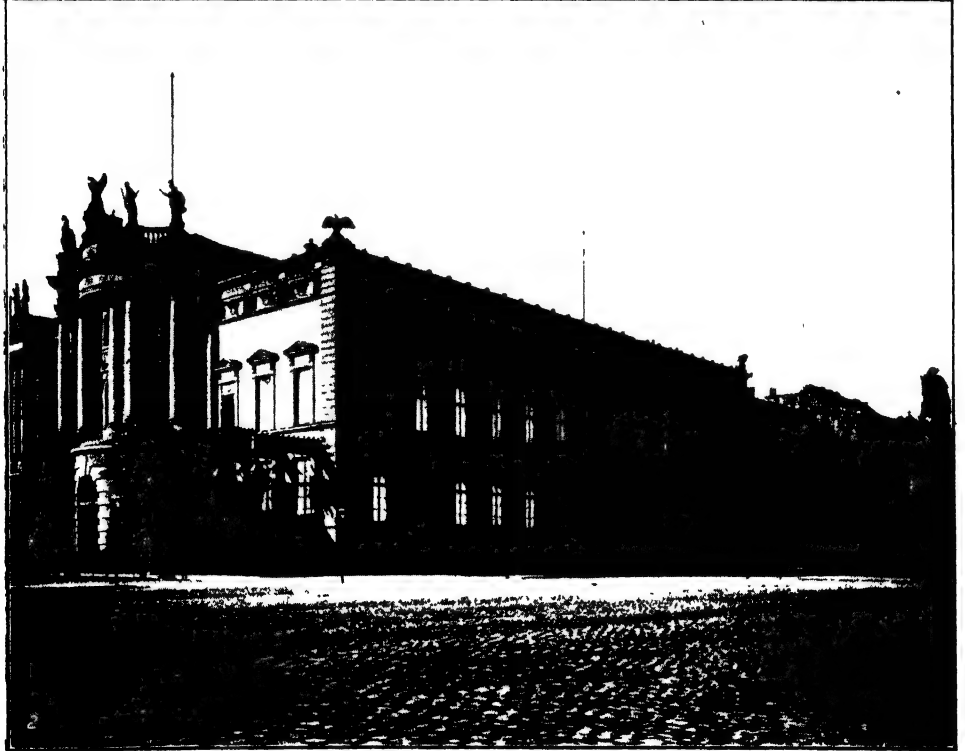
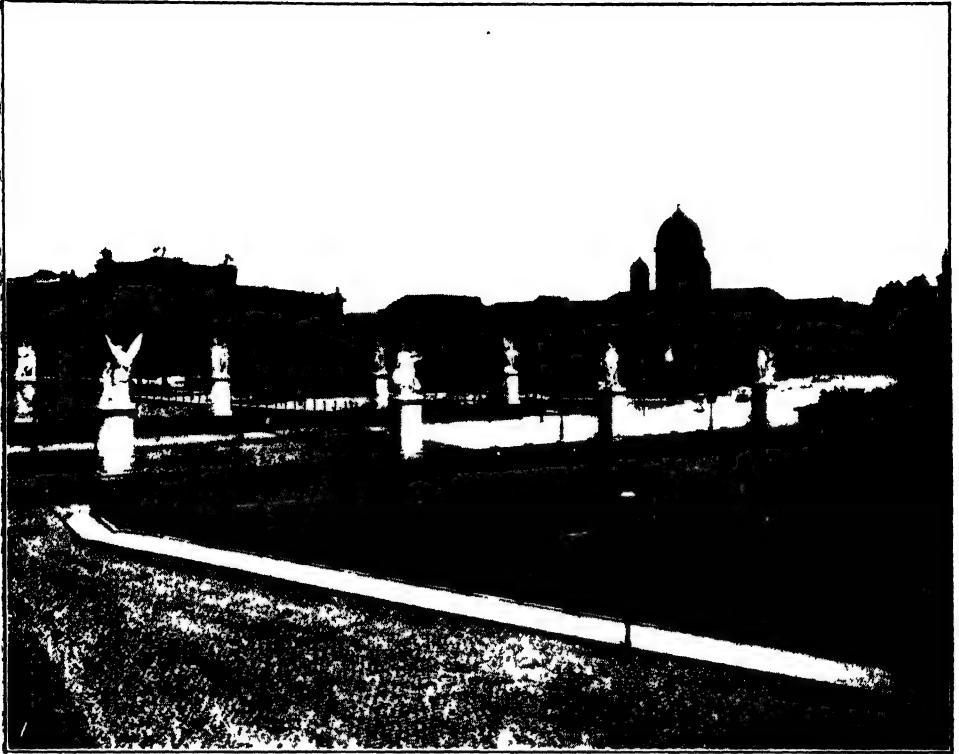
The city owns four immense gas works, which furnish some 4,600,000,000 cubic feet of gas, besides private works with a capacity of one third of that amount. There are also four central electric plants for lighting the city. The hydraulic station at Tegel and the waterworks on the Muggel Lake, provide the city with nearly 1,800,000,000 cubic feet of filtered water. These municipal waterworks estimated at more than \$16,000,000, give the city a net income of about \$500,000 after defraying all the current expenses, and the gradual amortisation of the original expenditure.

The drainage system of Berlin is generally considered a model, though the city, lying on a plain, is less advantageously situated for natural drainage than perhaps any other large municipality. A perfect canalization of some 420 miles of enormous earthen pipes and about 100 miles of walled canals, spreading in all directions below Berlin and its suburbs, disposes of the refuse, carrying it from 7 to 9 miles away from the city to the municipal sewage farm (*Rieselfelder*) divided into some 12 drainage districts of about 30 square miles. The perfection of the sewage system, which since 1890 has been in perfect operation, and the purchase of the large area of waste land, cost about \$28,000,000. The utilization of the farm, however, by the municipality, according to Hobrecht's ingenious plan, for scientific agriculture, pays already handsomely for the investment. A wonderful system of filtration and methodical irrigation causes the soil not only to swallow up and disinfect the entire refuse of the great metropolis, but also permits the municipality to carry on, since 1877, an extensive trade with its own garden products.

The street-cleaning department of the city occupies about 1,500 persons, 56 sweeping machines, and 186 sprinkling wagons. The total cost, including the carting of snow and sprinkling, is about \$288,000. The work is performed between midnight and sunrise.

The municipal abattoir (*Vieh und Schlachthof*), or slaughter-house, in which about 1,500,000 animals are killed annually, and which has done away with the numerous private slaughter-houses, also contributes greatly to the hygienic conditions of the city, furnishes whole-

BERLIN.



- 1 Schlossbrücke, with Lust Garten.
2. Palace of Emperor William I.

BERLIN.



1. Lust Garten, showing Statue of Frederick William III.
2 Brandenburg Gate.

BERLIN

some, well-inspected meat, and ensures alike safety to the public and humane treatment of the animals. There are 15 municipal market-halls (the foremost among them being the Central Hall on Alexander Square, close to the great railroad station), which have greatly improved, cheapened, and simplified the feeding of the population. Direct importation of all food-stuffs from every corner of the empire, expert control of the products, and prevention of extortionate prices, has reduced sale and purchase to a well-nigh patriarchal state of benignant state-socialism.

The street-car system of the city and its extensive suburbs is still private and will remain until the charters of the companies expire in 1911; meanwhile their rights are strictly guarded, and the fulfilment of their duties to the public and to the city carefully watched; they pay the municipality over \$200,000 in taxes, but are very prosperous.

The habitations of the population, in spite of its enormous increase, are becoming better and healthier, owing to the increasing care of the municipality for the poor. The conditions for hygiene and comfort were formerly at times extremely unfavorable. Before the opening up of the outlying districts, and an adequate connection of the suburbs with the city by bridges, railways, horse-cars, omnibuses, electric railways, and ferries, the central city was overcrowded by the ever-increasing population, and the death-rate accordingly was very high. Damp and unsanitary tenements and cellar-dwellings were constant sources of disease and immorality. Both the federal and municipal governments did their utmost to abolish, or at least to restrict, the narrow subterranean quarters, by condemning the slums and enforcing new buildings by strict-building regulations. The death-rate fell from 29.98 per 1,000 in 1885 to 18.16 in 1898, and is still decreasing.

The Administration of Charities has charge of the municipal shelter-house, which accommodates about 1,200 homeless families annually, and an average of 770 homeless persons daily; and of the orphanages and asylums in Berlin and Rummelsburg. Physicians for the poor are distributed throughout the city. In 1900 the sum of \$2,016,501 was expended for public charities. Private charity, which is practised by numerous associations, is not determinable statistically. In April 1900, 5,028 orphan children were under municipal care. The hospitals for the poor required about \$1,440,000 for their support.

The municipal debt of Berlin at the end of 1900 amounted to \$69,031,527, but this large debt is greatly offset by assets calculated at \$138,581,750, 31 March 1899, and the enormous improvements of the city. The receipts and expenditures for the fiscal year amounted to \$25,737,146, and this was considered favorable enough to abolish the income tax for the lowest class of income (up to \$160), and also the rental tax in 1895. The municipal taxes for 1900 were estimated at nearly \$14,400,000 or \$7.55 per capita; considerably less than the rate in Paris.

Berlin is the centre of culture of the empire. The Academy of Sciences was founded by King Frederick I. in 1700, upon the initiative of Leibniz. It is a privileged corporation, consisting of a physical-mathematical, and a philosophic-

historical class. The university was founded in 1810 by Frederick William III., whose name it bears, and had 5,431 regular students and 5,092 hearers in the summer of 1901. More than 60 academic institutes serve as auxiliaries to the university, besides the library, containing 162,000 volumes, 155,000 theses. To the courses of the university are admitted also the members of the schools of military surgery, and the students of the other schools of university rank. At the Military Academy there are 26 military and 19 civil professors for commissioned officers. The combined artillery and engineer school in Charlottenburg has 11 military, 14 civil professors, and 250 officers. In 1901 the School of Technology in Berlin-Charlottenburg, the greatest and most important technical school of the empire (founded 1799), had 3,107 students; the Geological Institute and School of Mines had 19 professors, 15 students; the School of Agriculture, 33 professors and 352 students. There are also the Academy of Fine Arts, Veterinary School, Seminary for Oriental Languages, and scores of others, all with full university standing.

Secondary instruction is represented by 28 gymnasia and real-gymnasia (without Greek), having courses of nine years, and 12 secondary schools offering courses of six years; 2 royal and 6 municipal secondary schools for girls; 231 communal schools, with over 200,000 boys and girls, and over 4,000 teachers. The Royal Library, with 950,000 volumes and 30,000 manuscripts, many of which are unique or extremely rare and valuable, and the libraries of all the great schools of university rank, and of the various branches of the government, ministries, Parliament, etc., provide inexhaustible literary material. Twenty-two great theatres, hundreds of learned societies, four great lodges of freemasonry, and 1,163 newspapers and magazines, complete the circle of intellectual endeavor.

In spite of its unfavorable inland situation, Berlin has become a great commercial emporium. For many articles, as grain, spirits, wool, flour, iron, drugs, oil, leather, wood, coal, and cattle, it is, if not a world-market, yet one of the greatest European markets. Its book industry has surpassed Leipzig; in metal and machine industries, iron-foundries, manufacturing of arms, locomotives, heating-apparatus, electrical works, porcelain and crockery goods, textiles, etc., it is hardly surpassed by any other city in Europe. Twelve railway lines with seven stations, excluding the city and ring-railways, serve as veins and arteries for import and export in all directions. The waterways also carried 6,472,621 tons of merchandise of all kinds in 1899. The electrical railways within the radius of the city, of a total length of 276 miles, carried in 1900, 379,000,000 passengers.

History.—The origin of Berlin is shrouded in darkness. Documentary evidence of its existence reaches back to the year 1244, under the Margraves, John and Otto; but at that time it already possessed the full-fledged rights of a Brandenburg city. Its sister city Kölln (Colonia), on an island of the Spree, derived from Wendish "Kollen" ("hill surrounded by marshes and water"), is first mentioned in 1238. Numerous remnants of Slavic civilization, vessels, bone, tools, fire-hearths, etc., found especially on the left bank of the Spree, clearly indicate its Wendish origin. Very likely fortified Kollen

BERLIN — BERLIN CONGRESS

was to control and defend the passage across the Spree up to the next strong Wendish settlement, Kopenice, or Kopenick. The eastward movement of the migrating Germans during the 12th century found strong Wendish settlements already in that neighborhood, which stretched over the wooded high plain, the *Barlin*, beyond the Spree. First the later Ascanians, a dynasty founded by Albrecht the Bear, settled the place with German colonists, while the huts of the Wendish fishermen stood along the banks of the Spree. The German fortresses of Spandau and Kopenick were built to protect the Spree line and the coalescing cities, which were surrounded with strong walls—a barrier between Slav and Teuton. When Emperor Louis IV., the Bavarian, gave the Mark Brandenburg to his house of Wittelsbach as a fief, Berlin became a centre of the struggle between this dynasty and the Ascanians. The murder of Abbot Nicolaus of Bernau in Berlin led to a papal excommunication and heavy damages. However, after reconciliation with the Bavarian margraves, Berlin grew strong, became the capital of the territories of Barnim and Teltow, centre of the estates of the Middle Mark, and a member of the Hanseatic League. Under the succeeding rulers of the House of Luxemburg, the city purchased rich privileges, even its own jurisdiction, but was unable to hold its own against the anarchy and terrorism of the Markish robber-knights, especially the *Quitows*. In 1415,—a date of tremendous import for Berlin and Prussia, and indeed for the German empire.—Frederick VI, burgrave of Nuremberg, of Hohenzollern, obtained the Mark Brandenburg as an unredeemed pledge from the Luxemburgers. With this monarch, Frederick I of Brandenburg, begins the dynasty of Hohenzollern, under whom the former Wendish fishermen's village became, in our own days, the capital of the modern German empire.

Order was restored with an iron hand, but the city resisted the encroachments of the second elector, Frederick II, upon its liberties or license. It lost many privileges and paid heavy fines. The Electoral castle in Kölln, the nucleus of the Schloss of to-day on the Spree, was more of a fortress than a palace. But the resistance was bent, and from that time on Berlin remained the permanent residence of the dynasty under the fostering care of all its members. Joachim I., an ardent Roman Catholic, struggled against the Protestant tendencies of Berlin, but his son, Joachim II, went over to the Lutheran Church, 2 Nov. 1539. The passing of John Sigismund to the Reformed Church in 1613 brought about heavy tumults among the burghers. During the Thirty Years' war Berlin redeemed itself from Swedish ravage by heavy indemnity. The Great Elector healed the wounds inflicted by the great conflict, built Friedrichswerder and the Dorotheenstadt as separate cities, improved and enriched the rest, received the highly cultured Waldenses, Dutch, and especially the Huguenots, who had been driven from home by religious persecution and now formed a powerful leaven in elevating the city intellectually and materially. His son, Frederick I., king of Prussia, united the four separate communities into one city, for better administration in 1709. Through a tremendous building activity he wrecked the finances of his state, but made Berlin a capital of great beauty. The foundation

of the Academies of Arts and of Sciences made it one of the foremost intellectual centres of Europe. His successor, the soldier-king, Frederick William I., made it a powerful garrison, received the exiled Salzburg Protestants, founded a great number of lower schools and seven churches, while destroying the academies and institutions for higher learning. Under Frederick the Great, the city was taken by the Austrians in 1757, and by the Russians in 1760, and laid under very heavy contributions. But the king enriched it greatly after the wars, and made it a great industrial and commercial centre. The occupation of Berlin by the French from October 1806 till December 1808 destroyed its wealth and progress for a time. With the introduction of the Prussian municipal legislation (*Stadteordnung*) in 1809, the foundation of the university in 1810, the monumental public buildings, collection of art treasures, and the immense rise of the national spirit and intellectual genius of Prussia, as well as the unsurpassed political elevation, Berlin realized a progress in the 19th century comparable only to that of several American cities. As the capital of the German empire, Berlin is the seat of the imperial court and of almost all the highest resorts of the governmental machine of the empire (except the supreme court, which sits in Leipsic), the political, military, and intellectual life of the nation appears to be centralized in Berlin, whence it radiates to the farthest corners of the realm. The precinct of the city has a surface of about 40 square miles.

Literature—'Berlin und Seine Bauten' (Architektenverein 1877-96); A Streckfuss, 'Fünf Hundert Jahre Berliner Geschichte' (1886); L. Geiger, 'Geschichte des Geistigen Lebens' (Berlin 1893-4); 'Statistisches Jahrbuch der Stadt Berlin' (ed. yearly by Bockh, director of the Statistical Bureau of Berlin); Albert Shaw, 'Municipal Government in Continental Europe' (New York 1895); Moller, 'Preussisches Stadtrecht'.

HERMANN SCHOENFELD,

Professor of Germanics, Columbian University.

Berlin, N. H., a city of Coos County, situated on the Androscoggin River and on the Grand Trunk and Boston & M. R.R.'s. It has an excellent water-power and various manufactories, of which the chief is the sulphite pulp mill, probably the largest in the United States. There are also paper-mills, lumber-yards, and shoe factories. Pop. (1903) 10,086.

Berlin, Wis., a city of Green Lake County, situated on the Fox River and on the Chicago, M. & St. P. R.R. It has numerous industries, including manufactories of brooms, gloves, and mittens, shoes, and dairy and creamery supplies; it has also granite quarries and dairy interests. Pop. (1903) 4,600.

Berlin, a four-wheeled carriage, invented in Berlin, consisting of an enclosed fore portion for two occupants, and a back seat with a calash top for servants.

Berlin Congress, a gathering at Berlin, Germany, where the European powers undertook the settlement of the questions growing out of the Russo-Turkish war of 1877-8. The Congress met 13 June 1878; and completed its labors with the signing of a treaty on 13 July following. The treaty of San Stefano (3 March 1878), between Russia and Turkey did not suit the other powers; and the congress,

BERLIN DECREE—BERMUDA

convened, at the suggestion of Germany, so modified the agreement between Russia and Turkey that the former lost nearly all the fruits of victory. By the new arrangement Bulgaria was divided into two parts, Bulgaria proper and eastern Rumelia. Parts of Armenia were given to Russia and Persia; the independence of Rumania, Servia, and Montenegro was guaranteed; Bosnia and Herzegovina were transferred to Austria; and Bessarabia restored to Russia. Greece was also to have an accession of territory. By a separate arrangement previously made between Great Britain and Turkey, the former got Cyprus to administer. Bismarck was the president of the congress. The more important members were: Prince Gortchakoff, Count Andrassy, Lord Beaconsfield, Lord Salisbury, M. Waddington, Count Corti, Karathéodori Pasha, Prince Hohenlohe, and Gen. von Bulow.

Berlin Decree, a decree issued by Napoleon, 21 Nov. 1806, which declared the British Islands in a state of blockade. It forbade commerce with them and trade in their merchandise, and declared all merchandise belonging to Englishmen or transported from England, lawful prize. Its effect was to inflict great injury on the American carrying trade.

Berlin Spirit, a coarse spirit distilled from potatoes, beets, etc.

Berlin, University of, a celebrated institution of learning in Berlin, Germany. It is, with the exception of Bonn, the youngest of the German universities, but is probably the most famous of them all. It was founded in 1810, when the Napoleonic victories had left Prussia apparently crushed, and had even transferred her great University of Halle to the newly formed kingdom of Westphalia. Wilhelm von Humboldt was minister of education at the time, and Prussia's debt to him for organizing her national school system, with the University of Berlin at its head, during that period of national defeat and disaster, is certainly very great. It should be borne in mind, too, that Humboldt was ably seconded by Fichte and Schleiermacher. The first rector of the university was Schmalz; the first deans of its faculties were Schleiermacher, Biener, Hufeland, and Fichte; and before it was 10 years old it had for professors such men as Niebuhr, Wolff, Bockh, Bekker, and Hegel. In more recent years, Ranke, Mommsen, Helmholz, Virchow, and other famous scholars have upheld the reputation which the university won for itself at the very start. There are four faculties, theology, medicine, jurisprudence, and philosophy, with a total of 377 professors and teachers. At the satisfactory completion of the course, the doctor's degree is conferred. The number of students in 1898 was 5,935, besides a large number of non-matriculated ones.

Berliner, Emile, bâr-lê-nêr, â'mêl, American inventor: b. Hanover, Germany, 20 May 1851. After graduating at Walfenbüttel in 1865, he came to America five years later, and in 1878 was appointed chief inspector of instruments by the Bell Telephone Company. He invented the loose contact telephone transmitter or microphone, known by his name, and the device called the gramophone. He has devoted his energies to perfecting the telephone, and has secured many patents for his inventions.

Berlioz, bâr-lê-ôs, **Hector**, French composer: b. Côte St. André, near Grenoble, 11 Dec. 1803; d. Paris, 9 March 1869. He forsook medicine to study music at the Paris Conservatoire, where he gained the first prize in 1830 with his cantata 'Sardanapalus,' enabling him to study at Rome. For about two years he studied in Italy, and when on his return he began to produce his larger works he found himself compelled to take up the pen both in defense of his principles and for his own better maintenance. As critic of the *Journal des Débats* and feuilletonist he displayed scarcely less originality than in his music. His chief literary works (besides his 'Memoirs') are the 'Traité d'Instrumentation' (1844); 'Voyage Musical' (1845); 'Les Soirées d'Orchestre' (1853); and 'A Travers Chants' (1862). His musical works, which display remarkable originality, belong to the Romantic school, and are specially noteworthy for the resource they display in orchestral coloring. He was a great champion of what is commonly known as "programme music." His more important works are 'Episode de la Vie d'un Artiste'; 'Symphonie Fantastique' (1829); 'Lélio, ou Le Retour à la Vie' (1832); 'Harold en Italie' (1834); 'Romeo et Juliet' (1839); 'Damnation de Faust' (1846), one of the best-known and most admired of his works; the operas 'Benvenuto Cellini' (1838); 'Beatrice and Benedict' (1862); and 'Les Troyens' (1864); 'L'Enfance du Christ' (1854), the 'Te Deum,' and the 'Requiem.' He married an English actress, Miss Smithson, but latterly lived apart from her. After his death appeared 'Mémoires' (1803-65), written by himself (English translation, 2 vols. 1884).

Berm, or Berme. In fortification, a narrow, level space at the foot of the exterior slope of a parapet, to keep the crumbling materials of the parapet from falling into the ditch.

In engineering, a ledge or bench on the side or at the foot of a bank, parapet, or cutting, to catch earth that may roll down the slope, or to strengthen the bank. In canals, it is a ledge on the opposite side to the tow-path, at the foot of a talus or slope, to keep earth which may roll down the bank from falling into the water. Slopes in successive benches have a berme at each notch, or, when a change of slope occurs, on reaching a different soil.

Bermejo, bêr-mă'hô, a South American river rising in Bolivia, and flowing across Argentina to the Paraguay River, which it enters about 140 miles south of Ascension. It is navigable for about half of its length of 1,300 miles.

Ber'mondsey, England, a parliamentary division of London, in Surrey, between Southwark and Rotherhithe. It has important leather manufactures, tanneries, etc. Pop. (1901) 130,760.

Bermuda, bêr-mû'da, or **Somers, Islands**, a cluster of small islands in the Atlantic Ocean, belonging to Great Britain, and situated 580 miles southeast of Cape Hatteras. They are in number about 400, but for the most part so small and so barren that they have neither inhabitants nor name. They were first discovered by Juan Bermudez, a Spaniard, in 1522; in 1609 Sir George Somers, an Englishman, was wrecked here, and after his shipwreck, formed

BERMUDA GRASS — BERN

the first settlement. The most considerable of these islands are St. George, Bermuda or Long Island (with the chief town, Hamilton, forming the seat of the governor), Somerset, St. David's, and Ireland. They are chiefly used as a naval and military station. The island of Ireland is occupied by a government dockyard and other naval establishments, while Boaz and Watford islands have the military depots. The military headquarters are at Prospect. An immense iron floating-dock was constructed at London for the Bermudas in 1868; it is capable of receiving a vessel of 3,000 tons. The climate is generally healthy and delightful, the air being mild and moist at all seasons. It is not adapted, however, for consumptive patients. The thermometer seldom falls below 40° F., and rarely rises above 85°. These islands have therefore become a popular holiday resort for Americans, and plentiful hotel accommodation is supplied at St. George's and Hamilton. The surface is rather irregular; the soil, though light and stony, is in general rich and fertile. The islands form a nearly continuous chain, and are connected almost uninterruptedly by roads, bridges, and causeways. The water is in general salt; there is but little fresh except rain-water, preserved in cisterns. The inhabitants export early potatoes, onions, lily bulbs, etc., nearly all of these products being shipped to New York. The value of the exports is from \$585,000 to \$635,000 annually; that of the imports is about \$1,460,000 to \$1,560,000. The revenue is about \$166,000. Pop. (1897) 16,098.

Bermuda Grass (*Cynodon dactylon*), a grass cultivated in the West Indies and the United States, where it is of special value on the sandy soils of the southern States. It is a valuable fodder grass for warm climates. It will grow in any soil not too damp, but in America it matures only in the extreme south.

Bermuda Hundred, Va., a peninsula formed by the junction of the Appomattox and James rivers, occupied by Gen. B. F. Butler, who, in 1864, commanded the Army of the James, numbering about 25,000 Federals, where he might intrench himself and await Grant's arrival. In the vicinity of this position there was constant fighting between Butler's troops and those of the Confederates under Gen. Beauregard, whose forces were 20,000 strong. The fighting continued from 16 May to 30 May. On the 16th Heckman's brigade was destroyed by the Confederates, who were then pushing on to Bermuda Hundred, when Ames and Gillmore came up and Beauregard's plans miscarried. On the 19th the Confederates assaulted the Federal rifle pits under Ames and Terry, but without success. Skirmishing continued until the 30th, when the Confederates desisted. Bermuda Hundred was a valuable position, since it was very near both Richmond and Petersburg; but Butler was charged with military incapacity in having "corked himself up in a bottle."

Bermudez, Remigio, Morales, bār-moo'-dāth, rā-mē'jē-ō mō-rā'lēz, Peruvian statesman: b. Tarapaca Province, 30 Sept. 1836; d. Lima, 31 March 1894. He began business in the nitrate trade in his native province. In 1854, as a lieutenant, he joined the revolutionary army which finally overthrew Gen. Echinique's

government. In 1864 he joined the revolution against President Castilla. In the war with Chile he led the force that marched to Arica. When Caceres was elected president in 1886, Bermudez was chosen vice-president, and was elected president in 1890.

Bermudez, bër-mū'dāth, Venezuela, a northeastern state situated between the Orinoco and the Caribbean Sea, formed in 1881 from the former states and present sections of Barcelona, Cumana, and Maturin. Area, 32,243 square miles; Pop. about 325,000.

Bern, bärn, or bern, Switzerland, the chief canton of the confederacy, situated in the western half and surrounded by the cantons of Neuchâtel, Freiburg, Vaud, Valais, Uri, Unterwalden, Lucerne, and Solothurn, being partly bounded also by France and Alsace; area, 2,657 square miles. The more northern portion of the canton has beautiful plains and valleys, and a fertile and highly cultivated soil, producing corn, wine, and fruits; the Emmenthal, one of the richest and most fertile valleys in Switzerland, raises the finest cattle, and produces a celebrated cheese. The southern portion of the canton, the Bernese Oberland, begins at the foot of the high mountain chain between this canton and that of the Valais, and extends to its summit. The lower valleys produce good fruits, and are fertile and agreeable: higher up are excellent Alpine pastures; then succeed bare rocks, extensive glaciers (the source of magnificent streams and waterfalls), and some of the highest mountains of Switzerland, as the Finsteraarhorn, the Schreckhorn, and Wetterhorn, the Eiger, the Jungfrau. The chief trade of the canton is in linen and woollen manufactures, and cattle-raising. Pop. (1897) 548,061.

After belonging to the Franks and Burgundians the Bernese territory became part of the German empire. In the long wars with Austria, Milan, Burgundy, and Savoy, the Confederacy came off victorious, and Bern conquered Aargau. In 1528 the citizens of Berne embraced the cause of the Reformation. In the subsequent war with the Duke of Savoy they conquered the Pays de Vaud. From that time till 1798 the prosperity and wealth of Bern constantly increased, so that the canton then contained above 5,000 square miles and about 380,000 inhabitants. On 5 March 1798, 30,000 French troops marched against Bern and conquered it, the result being that it now lost about half of its possessions; the northern part was united with the present canton of Aargau, and out of the southwestern (Pays de Vaud) the present canton of Vaud was formed. By the decrees of the Congress at Vienna, however, the greater part of the bishopric of Basel was joined to the canton. The present constitution dates from 1893 and is purely democratic. The legislative power is vested in a Great Council elected by the people voting in 62 electoral districts, there being one member for every 3,000 inhabitants. The executive is vested in a governing council of nine members elected by the Great Council, both being chosen for four years. The referendum is in force, and all laws may be submitted to popular vote before they become valid. The "initiative," or right to propose new measures, may be exercised by 12,000 voters acting together, but a demand for revision of the constitution must be supported by 15,000 voters.

BERN — BERNADOTTE

Bern, Switzerland, the capital of the canton of the same name (see above) and of the whole confederation; situated on an elevated rocky peninsula, washed on three sides by the Aar, which is crossed by several bridges, including the handsome Nydeck Bridge, the huge iron Kirchenfeld Bridge, and the Kornhaus Bridge (opened in 1898), with a roadway 160 feet above the Aar, and a principal arch of 380 feet span. The streets are, for the greater part, straight, wide, and well paved; and the houses, partly provided with piazzas, are substantially built of stone. The streets are purified by rills of water and adorned with fountains. Among the public buildings are the great Gothic cathedral 1421-1573; the Church of the Holy Spirit; the University; the hall of the Swiss Federal Council; the art museum, containing the municipal picture-gallery; a hospital; the town-house, a Gothic edifice of the 15th century, restored 1868; the mint, corn hall, historical and archaeological museum; the natural history museum; observatory; deaf-and-dumb institution; infirmary; orphan and lunatic asylums. The public library possesses great treasures of printed books and manuscripts. Trade and commerce are lively; the manufactures consist of woolens, cottons, silks, machinery, chocolate, etc. The city was founded in 1191, and in 1218 the German emperor Frederick II declared it a free city of the empire and confirmed its privileges by a charter, which is still preserved. In 1353 it entered into the Helvetic Confederacy. In 1405 the greater part of the city was destroyed by fire, but it was afterward regularly rebuilt. The bear, as the heraldic emblem of Bern, figures frequently in a sculptured form; and a number of these animals in the flesh are kept at the cost of the municipality. There is a curious clock-tower containing mechanism by which the striking of the hours is heralded by the crowing of a cock and a procession of bears. Pop (1897) 49,030.

Bern, University of, a state educational institution having its origin in a minor school which in the early part of the 16th century was much enlarged by the demand for accommodations for theological students. About 200 years later it expanded by the institution of departments of law, science, and medicine, and about 1830 was formally reorganized as a State university. It has a library of about 40,000 volumes and manuscripts, and educates about 1,300 students.

Bernacle Goose, a large goose of northern Europe and Greenland, allied to the brant, and named *Bernicla cucopsis*, a name identified with strange old fables. It differs from the brant mainly in its white cheeks, as the lavender-gray of the mantle. This goose is a common winter visitor to western Europe, retiring in summer to Arctic regions to breed, but the region and the character of its nesting remain undiscovered. Up to comparatively recent times it was the belief of the European peasants that this goose was born from the stalked barnacles which adhere to driftwood, and sometimes to the branches of trees that reach down into the sea at high tide. Circumstantial accounts were given of the birth of the young, whose tiny wings (the waving filaments of the feeding cirripeds) could be seen sticking out of the shells from which they were supposed to escape.

So firmly was this fixed in the minds of the people that it is given and illustrated with much detail as truth in many books of the time; and the Roman Church permitted these geese to be eaten on holy days because they were sea-born, and therefore "fish"! What is less generally known is that the cirripeds were named after the bird, as their supposed parent; and not the bird after the crustacean. Bernicle, like "brant," refers to the "burnt" black color of the birds, as explained in the 'English Dictionary' and by other authorities. The name has been adopted as generic for a large group of the geese usually distinguished by sportsmen as "brants" (q v).

Bernadotte, Jean Baptiste Jules, bår-nä-döt', zhõn bap-těst zhool, king of Sweden: b. Pau, 26 Jan. 1764; d. 8 March 1844. He was the son of an advocate of Pau, and enlisted in a French regiment of marines at the age of 17. He was made a subaltern in 1790, and thereafter his promotion was rapid. In 1794 he was appointed general of division, and distinguished himself greatly in the campaign in Germany and on the Rhine. After the battle of Neuwied he was introduced for the first time to Bonaparte, who conceived the highest opinion of his abilities, though a constant suspicion of Napoleon seems always to have been present in the mind of Bernadotte. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. The following year he became minister of war, but was shortly obliged to resign. On the establishment of the empire Bernadotte was created Marshal of France and Prince of Ponte-Corvo. At the head of an army of observation stationed in the north of Germany, he fixed his headquarters at Hamburg. At this time Gustavus IV. had been driven from the throne of Sweden. The Duke of Sudermania assumed the crown under the name of Charles XIII.; and as he was far advanced in years the diet had nominated, as his successor, the Prince of Holstein-Augustenburg, when the latter died in a mysterious manner. The heir-apparentcy to the Swedish crown was then offered to the Prince of Ponte-Corvo. This offer was accepted by Bernadotte with the consent of the emperor; and in October 1810 he arrived in Sweden, where, having previously abjured the Roman Catholic religion, he was proclaimed heir-apparent to the throne under the title of Prince Charles John. He had not long been established in this dignity before serious disagreements took place between him and Bonaparte, whose blockade of the Continental ports was very detrimental to the commercial interests of Sweden. The result was a complete rupture, and the accession of Sweden in 1812 to the coalition of sovereigns formed against Napoleon. At the battle of Leipsic Prince Charles John contributed effectually to the victory of the allies. On the general re-establishment of the European dynasties at the termination of the war, strenuous but unsuccessful attempts were made by the emperor of Austria and other sovereigns to restore the family of Gustavus IV. to the crown; and Bernadotte, retaining his position as crown-prince, became king of Sweden on the death of Charles XIII. in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important public works were completed; among others, the Götha Canal.

He was succeeded by his son Oscar, father of the present sovereign, Oscar II.

Ber'nadou, John Baptiste, American naval officer: b. Pennsylvania, 1858. Educated at the Naval Academy in Annapolis, he entered the navy and in the Spanish-American war commanded the torpedo boat Winslow and was wounded in a naval engagement off Cardenas in May 1898. He has written 'The Development of the Resources of the United States for the Production of War Material'; 'The Development of Smokeless Powder'; 'A Trip Through Northern Korea in 1883-4.'

Bernard, bér'nard, bér-nàrd', or (Fr.) bār-nar, Saint(OF CLAIRVAUX), French ecclesiastic: b. Fontaine, Burgundy, 1091; d. 1153. In 1113 he became a monk at Cîteaux; in 1115 first abbot of Clairvaux, near Langres. An austere manner of living, solitary studies, an inspiring eloquence, boldness of language, and the reputation of a prophet, rendered him an oracle to all Christian Europe. He promoted the crusade of 1146, and quieted the fermentation caused at that time by a party of monks against the Jews in Germany. He declined all promotion, and in the rank of abbot of his "beloved Jerusalem" (as he used to call Clairvaux) he continued with all humility, but with great boldness, his censures of the clergy and his counsels to the Popes. Innocent II. owed to him the possession of the right of investiture in Germany, and Eugenius III. his education. He was, at the same time, the umpire of princes and bishops, and his voice in the synods was regarded as divine. By his rigid orthodoxy and his remarkable eloquence, which were always directed to the promotion of practical Christianity, he did much to confirm the power and influence of the Church in the Middle Ages. He was a strong opponent of Abelard and Gilbert of Porée in their philosophical teachings. He was canonized by Alexander III. in 1174. The best edition of his works is that of Mabillon (Paris 1690, 2 vols., reprinted, Paris 1839-40).

Bernard, Saint, of Mentone: b. Mentone, Savoy, 923; d. Novara, May 1007. Very little is known of his life except that he was at one time archdeacon of the city of Aosta, and that he later entered upon a monastic life and founded the hospices on the Great and Little Mount Saint Bernard, about 962 A.D.

Bernard, bā-nār', Charles de, properly **Bernard du Grail de la Villette**, French novelist: b. Besançon, 25 Feb. 1804; d. Neuilly, 6 March 1850. He was a disciple of Balzac, whom he resembles in his power of realistic description and psychological analysis; but he possesses a purer and more nervous style, and above all is content with a less minute elaboration of story and characters. His first piece, 'The Gervalcon,' made a hit with its clever description of the literary cliques. Everywhere he evinces clear insight into the foibles of society. Of his novels, the following may be named as only second in rank to his masterpiece, 'The Gervalcon'; 'A Magistrate's Adventure'; 'The Gordian Knot'; 'Wings of Icarus'; 'The Lion's Skin'; 'The Country Gentleman.'

Bernard, bār-nār, Claude, French physiologist: b. Saint-Julien, department of the Rhône, 12 July 1813; d. Paris, 10 Feb. 1878. Educated

at Villefranche and Lyons, he went to Paris in order to devote himself to a literary career, but soon turned to medicine. In 1839 he became assistant to Magendie, who directed his attention to experimental physiology. He became professor at the Collège de France in 1855, and about the same time he was appointed to the chair of experimental physiology at the Sorbonne. In 1868 he resigned the latter chair in order to take up a similar one in the Museum of Natural History, and in that year also he was elected to Flourens' place in the Academy. He was one of the foremost physiologists of his age, and several important discoveries are associated with his name. Among his published works are 'Experimental Physiology Applied to Medicine' (1854-5); 'Physiology and the Pathology of the Nervous System' (1858); 'Physiological Properties and Pathological Alterations of the Liquids of the Organism' (1859); 'Properties of Living Tissues' (1866); 'Experimental Pathology' (1871); 'General Physiology' (1872); 'Animal Heat' (1876); 'Phenomena of Life Common to Animals and Vegetables' (1878-9); 'Experimental Science' (1878); etc. He was accorded a national funeral.

Bernard, bér'nard, Sir Francis, English administrator: b. Nettleham, England, 1714; d. Aylesbury, England, 16 June 1779. He was governor of New Jersey 1758-60, and of Massachusetts Bay 1760-9. He did a great deal toward precipitating the Revolution by his aggressive attempts to strengthen the royal authority. He was finally recalled on account of the unpopular result of his bringing troops into Boston.

Bernhard, bār-nar, Karl, pseudonym of **Nicolai de Saint Aubain**, celebrated Danish novelist: b. Copenhagen, 18 Nov. 1798; d. Copenhagen, 25 Nov. 1865. His induction into the republic of letters was under the auspices of his noted kinswoman, Madame Gyllembourg. The poet Heiberg was his uncle; the nephew has almost overshadowed the older writer through the brilliance of 'The Favorite of Fortune'; 'Two Friends'; 'For and Against'; and many other novels, all founded either on historical occurrences or on the author's observations of contemporary life.

Bernard, Montague, English lawyer: b. Gloucestershire, 28 Jan. 1820; d. Overross, 2 Sept. 1882. He was professor of international law at Oxford 1859-74. In 1871 he was one of the high commissioners who signed the Treaty of Washington, and on his return home was made a privy councillor. In 1872 he assisted Sir Roundell Palmer in preparing the British case for the Geneva Arbitration Tribunal.

Bernard, Pierre Joseph, bār-nār, pē-ār zhō-sēf, or **Gentil (zhōn-tēl) Bernard**, French poet: b. Grenoble, 1710; d. 1775. At an early age he showed a great taste for poesy, and was at first only an attorney's clerk, but afterward became secretary to Marshal de Coigny, who had command of the army of Italy. After the marshal's death he obtained a lucrative appointment, and was then able to indulge his poetic faculties. He wrote an opera, 'Castor and Pollux,' which met with great success; the 'Art of Loving,' and a number of odes, songs, etc. His works were collected and reprinted in 1803.

BERNARD — BERNARDAKIS

Bernard; Simon, bār-nār, sē-mōn, French engineer: b. Dole, 28 April 1779; d. 5 Nov. 1839. He served as aide-de-camp to Napoleon; was wounded at the battle of Leipsic; superintended the defense of Torgau, and was present at Waterloo. In 1816 he came to the United States; was commissioned brigadier-general of engineers; and planned an elaborate system of seacoast defences, the most important of the works built by him being Fortress Monroe. In 1831 he returned to France; was made aide-de-camp to Louis Philippe, and designed the fortifications of Paris. In 1834 he was appointed minister of war.

Bernard, ber-nard, **William Bayle**, Anglo-American dramatist: b. Boston, Mass., 27 Nov. 1807; d. 5 Aug. 1875. His first work was a nautical drama called 'The Pilot.' This proved successful and encouraged him to pursue a literary career. He wrote in all 114 plays, of which the best known are 'Rip Van Winkle'; 'The Man About Town'; 'Marie Ducange'; and 'The Boarding School.'

Bernard de Chartres, bār-nār dē shart'r (surnamed SYLVESTRIS), a writer of the 12th century, who has been lauded as the ablest Platonic of his time, and wrote two works, now lost, in one of which he endeavored to reconcile Plato and Aristotle, and in the other maintained the doctrine of a Providence, and proved that all material beings, possessing a nature subject to change, must necessarily perish. Another work under the name of Bernard Sylvestris still exists, and is composed of two parts, distinguished by the names of 'Megacosmus' and 'Microcosmus,' or the 'Great World' and the 'Little World.' He reduces all things to two elements — matter and ideas. Matter is in itself devoid of form, but susceptible of receiving it; ideas reside in the divine intellect, and are the models of life, and from their union with matter all things result. M. Cousin has published extracts from these works.

Bernard of Cluny, Benedictine monk: b. at Morlaix, about 1100; d. 1156. He was a member of the Benedictine monastery at Cluny under Peter the Venerable, and is best known as the author of three hymns included in almost every English collection: "Jerusalem the Golden"; "For Thee, O Dear, Dear Country"; and "The World is Very Evil." These are a part of his 3,000-line poem 'De Contemptu Mundi,' translated by J. M. Neale.

Bernard (bér'nard) of Treviso (trě-vě'zō), Italian alchemist: b. Padua, 1406; d. 1490. His most important work was 'Treatise on the Most Secret Chemical Labor of the Philosophers.'

Bernard de Ventadour, bār-nar de vōn-tā-dōr, French troubadour: b. about 1125; d. Dalon, about 1197. Love songs 'To Eleonore,' and various amatory lays to courtly dames, form the riches of his delicate verse.

Bernard, bér'nard, **Great St.**, a celebrated pass of the Pennine Alps, Switzerland, in the canton Valais, on the mountain-road leading from Martigny to Aosta in Piedmont. On the east side of the pass is Mount Velan, and on the west the Pointe de Dronaz; there is no mountain known by the name of St. Bernard. Almost on the very crest of the pass is the famous hospice, among the highest permanently inhabited spots in Europe, 8,200 feet above the level

of the sea. There is a massive stone building capable of accommodating 70 or 80 travelers with beds, and of sheltering 300. As many as 500 or 600 have received assistance in one day. It is situated on the highest point of the pass, exposed to tremendous storms from the north-east and southwest, and is tenanted by 10 or 12 brethren of the order of St. Augustine, who have devoted themselves by vow to the aid of travelers crossing the mountains. The climate of this high region is necessarily rigorous. There is a lake on the summit, at a short distance from the hospice, on which ice has frequently remained throughout the whole year. The severest cold recorded is -29° F., but it has often been -18° and -20° F.; the greatest summer heat recorded is 68° F. From the difficulty of respiration in so elevated a locality, and the severity of the climate, few of the monks survive the time of their vow, 15 years from the age of 18, when they are devoted to this service. The dogs kept at St. Bernard to assist the brethren in their humane labors are well known. In the midst of tempests and snowstorms the monks, accompanied by some of these dogs, set out for the purpose of tracking those who have lost their way. If they find the body of a traveler who has perished they carry it into the vault of the dead, where it is wrapped in linen and remains lying on a table till another victim occupies the place. It is then set up against the wall among the other dead bodies, which, on account of the cold, decay so slowly that they are often recognized by their friends after the lapse of years. Adjoining this vault is a kind of burying-ground, where the bones are deposited when they accumulate too much in the vault. It is impossible to bury them, because there is nothing around the hospice but naked rocks. The institution is supported partly by its own revenues, partly by subscriptions and donations. The pass appears to have been known at a very early period; and a Roman road led down the Piedmontese side of the mountains. The remains of a massive pavement are still visible; and the cabinet of the hospice contains votive tablets, bronze figures, and other antiquities found in the vicinity. The hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of those who performed pilgrimages to Rome. In May, 1800, Napoleon led an army of 30,000 men, with its artillery and cavalry, into Italy by this pass.

Bernard, Little St., a mountain of Italy, belonging to what are called the Graian Alps, about 10 miles south of Mont Blanc. It stands between Savoy and Piedmont, having the valley of the Isère, in the former, on the west, and that of the Doire, in the latter, on the east. The pass across it is one of the easiest in the Alps, and is supposed by many to be that which Hannibal used. The hospice, at the summit of the pass, has an elevation of 7,192 feet.

Bernardakis, Demetrios, bér-nār'dā-kīs, dāmā'trě-ōs, Greek poet and dramatist: b. Santa Marina, Lesbos, 2 Dec. 1834. After a course of study at Athens and in German universities he was (with one considerable intermission) professor of history and philology in the University of Athens, 1861-82, when he went back to Lesbos. He is author of a spirited Pindaric ode for a jubilee occasion, of several dramas, and of a satire, 'The Battle of Cranes and Mice'; he

BERNARDES — BERNBURG

has also written a 'Universal History'; a 'Church History'; and a spirited tractate, 'Confutation of a False Atticism,' directed against the would-be Attic purists.

Bernardēs, Diego, ber-nār'dēs, dē-ā'gō, Portuguese poet: b. Ponte de Lima about 1530; d. 1605. He was called 'the Sweet Singer of the Lima,' a streamlet immortalized in his verse. He left his native valley in 1550 and attached himself to the master-singer, Sá de Miranda, who lived retired on his estate, Quinta da Tapada, a devotee of the Muses. Here Bernardes composed verses of all kinds — elegies, sonnets, odes, and songs, full of tender sympathies and perfect melody. Here he wrote 'The Lima'; 'Various Rimes — Flowers from Lima's Banks'; 'Various Rimes to the Good Jesu,' and other poems.

Bernardin de Saint Pierre, bār-nār-dān dē sãn pē-ār. See PIERRE, ST.

Bernardin of Sienna, Italian ecclesiastic: b. Massa, Italy, 8 Sept. 1380; d. Aquila, Abruzzo, 20 May 1444. He became a Franciscan friar in a monastery near Sienna in 1404, but, desiring to make a pilgrimage to the Holy Land, was appointed a commissary of that country, and was thus enabled to gratify his wish. After his return he acquired a great reputation as a preacher, and three cities were rival suitors for the honor of having him as bishop. Bernardin, however, was unwilling to accept the distinction, and was made vicar-general of the friars of the Observantine order in Italy. He is said to have founded more than 300 monasteries. In 1450 he was canonized by Pope Nicholas V. His works appeared at Venice in 1591 in 4 volumes quarto, and at Paris in 1636 in 2 volumes folio. They consist of essays on religious subjects, sermons, and a commentary on the book of Revelation.

Bernardines, bér-nar-dēnz. See CISTERCIANS.

Bernardo del Carpio, ber-nar'dō dēl kār'-pē-ō, Spanish knight-errant (the fruit of a secret marriage between Chimena, the sister of Alphonso the Chaste, and of Don Sancho, lord of Saldagua): b. in the 9th century. Alphonso, irritated at the marriage, put out the eyes of Don Sancho and imprisoned him in a castle, but spared Bernardo and brought him up carefully at his court. In course of time Don Bernardo grew up to be a warrior, and distinguished himself in the Moorish wars, in the hope that the king would be bent to pity and set his father at liberty. Alphonso was inflexible, and Bernardo withdrew to his paternal domains; and, leaguings with other lords opposed to the court, set him at defiance.

On the accession of Alphonso the Great, Bernardo returned to court, and again performed many exploits against the Moors, hoping to be rewarded with his father's freedom. He was once more denied the boon, and withdrew as before, not only leaguings with his friends, but making alliance with the Moors. Alphonso agreed at length to give up his father on receiving the surrender of the castle of Carpio. Bernardo, true to his word, performed his part of the stipulation, and then learned with indignation that Alphonso had practised an infamous deception upon him, as his father had been for some time dead. He disdained any longer to tread the Spanish soil, and removed to France, where he spent the remainder of his

life as a knight-errant. Many fabulous exploits have been attributed to him, both in Spanish romances and in more reliable histories.

Bernauer, bér-now-er, Agnes, Bavarian lady celebrated for her beauty and her unfortunate fate; d. 2 Oct. 1435. She was the daughter of a poor citizen, said to be a barber of Augsburg. Duke Albert of Bavaria, only son of the reigning prince, met Agnes at a tournament given in his honor by the grandees of Augsburg, became enamored of her, and, as he could not prevail on her to be his mistress, secretly married her. He conducted her to his own castle of Vohburg, and for a time succeeded in concealing the alliance he had contracted; but his father wishing to marry him to Anne, daughter of the Duke of Brunswick, he was compelled to acknowledge his marriage with Agnes. His father refused to credit it, and having caused the Duke to be denied admission to a tournament on the plea that he was living unlawfully with a woman, Albert openly proclaimed his marriage and caused Agnes to be recognized as Duchess of Bavaria, giving her for residence the castle of Straubing on the Danube. The Duke of Bavaria, incensed at this open avowal of a misalliance, caused Agnes to be seized in her castle during the absence of his son, brought her before a tribunal specially constituted, where she was accused of magic, and being condemned, had her hands tied together and was thrown into the river. Albert in revenge took arms against his father, but the Emperor Sigismund finally reconciled them. The Duke Ernest raised a chapel to the memory of Agnes, and Albert married the princess of Brunswick. Her story, though well authenticated, has become legendary from the interest attached to it, and is a favorite theme with the Bavarian poets.

Bernay, bār-nā, France, a town in the department of Eure, 25 miles west-northwest of Evreux, on the right bank of the Charentonne. It has two fine old churches, a communal college, a hospital, a court of first resort, a board of manufactures, an agricultural society, and a savings bank. It has important manufactures of cloth and flannel, tape, linen, and cotton goods; and spins a good deal of cotton, thread, and worsted. It has also bleachfields, dyeworks, tanneries, etc. Its trade is principally in grain, cider, cloth, iron, paper, leather, linen, horses, and cattle. The horse-fair, held in Lent, is one of the greatest in France, and is attended by purchasers from all parts of the country. Pop. (1891) 5,788.

Bernburg, bérn-burŋ, Germany, a town in the duchy of Anhalt, capital of the former duchy of Anhalt-Bernburg; on both sides of the Saale, northwest from Leipsic, with which, as well as with Berlin and Magdeburg, it is connected by railway. It is divided into the old, the new, and the high town; the first two surrounded by walls, and communicating by a bridge 173 feet long. Bernburg is well built, and contains several well-paved and well-lighted streets. The principal building is the palace, situated, with a garden, on the highest part of the high town. It is very ancient, but has received numerous modern additions, and contains a picture-gallery, theatre, and church. Besides an oil-mill, and several breweries and distilleries, there are manufactories of paper and

earthenware, copper and tin wares, etc. Pop. (1895) 32,374.

Berne-Bellecour Étienne Prosper, bärn-bél-koor, â-tê-én prôs-per, French painter: b. Boulogne, 29 July 1838. After some years of study under Barras and Picot, he made a reputation by his spirited representations of episodes in the Franco-Prussian war of 1870. He received a first-class medal in the Paris Salon of 1872; the Legion of Honor in 1878; and a second-class medal at the Paris Exposition of 1889. His best known works are: 'Cannon Shot'; 'In the Trenches'; 'Attack on the Château'; and 'To Arms!'

Berners, John Bouchier, boor'shē-ā, Lord, English baron, a descendant of the Duke of Gloucester, youngest son of Edward III.: b. 1474; d. 1532. He was member of Parliament, 1495-1529; aided in suppressing the Cornish insurrection, 1497; chancellor of the exchequer, 1515; ambassador to Spain, 1518; and for many years governor of Calais. He translated 'Froissart's Chronicles' (1523-5) and other works, his translation of the former being a sort of English classic.

Berners, or Barnes, Juliana, English prioress and author: fl. 15th century. She was the daughter of Sir James Berners, who was beheaded in the reign of Richard II. Little more is known than that she was prioress of the nunnery of Sopewell, near St Alban's, and has her name prefixed as writer or compiler to one of the earliest and most curious productions of the English press. The first edition, entitled 'The Treatyses Pertynynge to Hawkyng, Huntynge, and Fysshynge with an Angle' (of which only three perfect copies are known), printed in the abbey of St Alban's in 1486, treats of hawking, hunting, and heraldry. A second edition was printed by Wynkyn de Worde in 1496. This work, under the title of the 'Book of St. Alban's,' became a popular manual of sporting science, and was many times reprinted in the 16th century. It has latterly been issued in facsimile of the original print.

Bernhard, bern'hart, (DUKE OF WEIMAR), Dutch soldier (fourth son of Duke John of Saxe-Weimar): b. 6 Aug. 1604; d. 8 July 1639. He entered first the service of Holland, and afterward the Danish army employed in Holstein against the troops of the emperor, and commanded by the margrave of Baden-Durlach, and was present at the Conference of Lubeck, 1629, for negotiating peace. When Gustavus Adolphus entered Germany, Bernhard joined him, and was present at the attack upon Wallenstein's camp in the neighborhood of Nuremberg, 24 Aug. 1632. In the battle of Lutzen, 6 Oct. 1632, he commanded the left wing of the Swedish army, avenged the death of Gustavus Adolphus, and although himself severely wounded, put the right wing of the imperial troops to flight. In 1633 he took Bamberg, Cronach, Höchststadt, and Aichstadt; but his attempt upon Ingolstadt miscarried. He also brought the cities of Ratisbon and Straubing into his power, and frustrated Wallenstein's intentions. The king of Sweden made him Duke of Franconia. His impetuosity caused the defeat at Nordlingen (q.v.), 24 Aug. 1634. He himself narrowly escaped being made prisoner. The prudence of Oxenstiern and the valor of Bernhard soon made amends for this fault. France, now entering

into a closer alliance with Sweden, concluded a separate treaty with Bernhard, who went to Paris, 16 Oct. 1634. Bernhard promised for 4,000,000 livres to raise an army of 18,000 men on the Rhine to act against Austria. He now carried on the war in the country adjacent to the Rhine, took the fortress of Zabern in Alsace, spread his army over Lorraine and Burgundy, and vanquished the forces of the emperor in several battles. At the commencement of the year 1638 he laid siege to Rheinfelden, not far from Basel. Here he was unexpectedly attacked in his camp, 18 February, by an Austrian army. Bernhard was obliged to retreat before superior numbers, but, having soon collected his forces, he surprised the Austrians, 21 February, and obtained a complete victory. Several Austrian generals were made prisoners, and the fortress of Rheinfelden was obliged to surrender, 13 May. He then undertook the siege of Breisach, the possession of which was necessary for maintaining himself in Alsace. An imperial army, under General Goetze, was defeated with great loss by Bernhard, 30 July. Bernhard captured several places of inferior importance during the siege of Breisach, which, however, did not surrender until he had repeatedly defeated the Austrians, and then upon very moderate conditions, which Bernhard signed in his own name without mentioning France. The possession of Alsace, which he had before ceded to France under certain conditions, was now secured; but he also demanded Breisach as an appurtenance to Alsace. He garrisoned all the conquered places with German troops, and ordered money to be coined with the Saxon coat of arms and that of Breisach. In vain were the efforts of France to deprive the duke of the possession of Breisach by proposing to place a French garrison in the fortress; the Duke declined not only this proposal, but also an invitation to Paris and the offer of a marriage with the Duchesse d'Aiguillon, niece of Cardinal Richelieu. Instead of that match he proposed one with the princess of Rohan, to which, however, the French court would not accede, lest the party of the Huguenots should be strengthened. It is probable that Richelieu had recourse to poison in order to rid France of the Duke, who was becoming formidable by his growing power. Immediately after his death several French commissioners appeared, who enlisted his troops into the French army; the command of them was committed to Marshal Guébriant. With Bernhard fell one of the chief supports of the Protestants. His successors, Banér and Torstenson, pursued his victorious course, and France seriously exerted herself in the war which continued for the benefit of the Protestants. In Bernhard a graceful person, intelligence, and valor were united with a magnanimity which could not be shaken by adverse events; his only fault was too great impetuosity.

Bernhardi, August Friedrich, bérn-här'dē, ow'goost frē'drīx, German scholar: b. Berlin, 1768; d. there, 1820. In his youth his attention was directed to universal language (that is, to language as far as it is common to all rational beings), to the mystery of its construction — the mathematics, as it were, of language. Bernhardi, considering all different languages as a whole, endeavored to discover a universal grammar common to them all. The result of his researches appears in his works:

'Abstract Grammar' (2 vols. 1801); 'Grammar in Its Application' (1803); and 'Elements of the Science of Language,' in which many philosophical principles of language are laid down. Bernhardt is a man of cultivated mind and extensive knowledge. He was also a professor and director of a classical school in Berlin.

Bernhardt, Theodor von, tā'o-dōr fōn, German historian and diplomat: b. Berlin, 6 Nov. 1802; d. Kunersdorf, Silesia, 12 Feb. 1887. His diplomatic career was important, and afforded him special facilities for compiling a 'History of Russia and of European Politics During the Years 1814-31' (1863-77); 'Frederick the Great as a Military Commander' (1881); and similar works, all of value.

Bernhardt, Rosine, bārn-hart, rō-zēn, better known as SARAH, French actress. b. Paris, 22 Oct. 1844. Of Jewish descent, her father French, her mother Dutch, her early life was spent largely in Amsterdam. In 1858 she entered the Paris Conservatoire and gained prizes for tragedy and comedy in 1861 and 1862, but her début at the Théâtre Français in 'Phigénie' and Scribe's 'Valérie' was not a success. After a brief retirement she reappeared at the Gymnase and the Porte Saint-Martin in burlesque, and in 1867 at the Odéon in higher drama. Her success in Hugo's 'Ruy Blas' in 1872 led to her being recalled to the Théâtre Français, since which she has abundantly proved her dramatic genius. In 1879 she visited London, and again in 1880, about which time she severed connection with the Comédie Française under heavy penalty. In 1880, 1887, 1891, 1896, and 1900 she made successful appearances in the United States, and between and after these dates visited Switzerland, Holland, South America, Italy, Algeria, Australia, etc. In 1899 she appeared in a new rendering of 'Hamlet' in Paris, and scored a most flattering triumph. Among her most successful impersonations are 'Théodora,' 'Fédora,' 'La Tosca,' and 'Cléopâtre' in the plays bearing those titles. In 1882 she married M. Damala, a Greek, whom she divorced not long afterward. She is also known as a sculptor, painter, and playwright.

Bernhardt, Gottfried, bern'har-dē, gōt'frēd, German classical philologist. b. Landsberg-on-the-Warthe, 20 March 1800; d. Halle, 14 May 1875. He lectured very brilliantly at the leading universities, his principal works being 'Greek Syntax Scientifically Considered' (1829), a historical study of the subject; 'Outlines of Roman Literature' (5th ed. 1872); 'Outlines of Greek Literature' (Part I. 5th ed. 1892; Part II. 2d-3d ed. 1876-80; Part III. wanting), and a supplement to the first-named treatise, entitled 'Paralipomena [Omission] in [the Work on] Greek Syntax' (1854-62); although he has written many other important books.

Berni, Berna, or Bernia, Francesco, bér'nē, bér'nā, or ber'nē-a, fran-ches'kō, Italian poet: b. Lamporecchio, Tuscany, toward the close of the 15th century; d. 26 July 1536. His family was noble, but poor, and young Berni went to Florence, and at the age of 19 to Rome, where he lived under the care of his relation, Cardinal Bibiena. At length he entered the service of Ghiberti, bishop of Verona, datary of the papal chancery, as secretary. In the hope

of promotion he took orders; but sought recreation in amusements which displeased the prelate. A society had been established at Rome, consisting of young ecclesiastics of a jovial temper like Berni, and of a poetical vein, who, in order to denote their love for wine and their careless gaiety, called themselves *i vignajuoli* (vine-dressers). They laughed at everything, and made sport in verse of the most serious, nay, the most tragic matters. Berni's verses were the most successful, and were written in so peculiar a style that his name has been given to it (*maniera Bernesca* or *Bernesca*). When Rome was sacked by the troops of the Constable Bourbon, 1527, Berni lost all that he possessed. He afterward made several journeys, with his patron Ghiberti, to Verona, Venice, and Padua. At length, wearied with serving, and satisfied with a canonship in the cathedral at Florence, he retired to that place. The favor of the great, however, which he was weak enough to court, brought him into difficulties. He was required to commit a crime, and his refusal cost him his life. Alessandro de' Medici, at that time Duke of Florence, lived in open enmity with the young Cardinal Ippolito de' Medici. Berni was so intimate with both that it is doubtful which first made him the proposal to poison the other. Certain it is that the cardinal died by poison in 1535, and it is probable that Alessandro caused Berni's death.

In the burlesque style of poetry, Berni is still considered the best model. His satire is often very bitter, and frequently unites the good humor of Horace with the causticity of Juvenal. The extreme licentiousness of his writings is his greatest fault. Berni also wrote Latin verses very correctly, and was well acquainted with Greek. His 'Burlesque Verses' have great merit; so also has his *rifacimento* of Bojardo's 'Orlando Innamorato.'

Bernicia, ber-nish'ya, a Latinized form of the English word Bynelch, used to indicate the north part of what became the kingdom of Northumbria, the part north of the river Tees. The Anglian kingdom of Bernicia is said to have been founded by Ida, who made his capital at Bamborough about 550 A.D.

Bernier, ber-nyā, Camille, French painter: b. 1823. He did not exhibit until 1863, but in a few years became one of the leading landscape artists of France, a position he has held for 40 years. His best-known works are: 'The Abandoned Lane'; 'Evening'; 'A Farm in Brittany'; and 'Landes, Near Bannalec.'

Bernier, François, French physician and traveler: b. Angers, about 1625; d. Paris, 1688. He set out on his travels in 1654, and after visiting Egypt and Palestine, went into India, where his skill in medicine brought him into notice; and he remained for 12 years, residing chiefly at Delhi, as physician to the Great Mogul Emperor Aurangzebe. On one occasion he accompanied the prime minister on his march, at the head of an immense army, to the conquest of Cashmere, and in his travels, recording all that he saw, has given accounts full of interest, and recognized by subsequent travelers as remarkable for their fidelity. After his return to France he not only compiled his 'Travels' and several volumes of history relating to the empire of the Great Mogul, but turned his attention to philosophical subjects, and published

BERNINA — BERNOUILLI

an abridgment of the philosophy of Gassendi. He also wrote a treatise, entitled 'Traité du Libre et du Volontaire.'

Bernina, bër-ně'na, a mountain of the Rhætian Alps, 13,290 feet high, in the Swiss canton of Grisons, with remarkable and extensive glaciers. Its summit was first attained in 1850. The Bernina Pass, which attains an elevation of 7,642 feet, and over which a carriage road was completed in 1864, leads from Pontresina to Poschiavo.

Bernini, Giovanni Lorenzo, bër-ně'ne, jō-van'ne lô-rěn'zô, called IL CAVALIERE BERNINI, Italian sculptor and architect. b. Naples, 7 Dec. 1598; d. Rome, 28 Nov. 1680. Richly endowed by nature and favored by circumstances, he rose superior to the rules of art, creating for himself an easy manner, the faults of which he knew how to disguise by its brilliancy. From his early youth he manifested a great power to excel in the arts of design, and one of his first works was the marble bust of the prelate Montajo. He was not yet 18 when he produced the 'Apollo and Daphne,' in marble, a masterpiece of grace and execution. Looking at this group near the close of his life, he declared that he had made very little progress since the time when that was produced. Without forsaking sculpture, Bernini's genius embraced architecture, and he furnished the design for the canopy and the pulpit of St. Peter's, as well as for the circular place before the church. Among his numerous works were the palace Barberini, the belfry of St. Peter's, the model of the monument of the Countess Matilda, and the monument of Urban VIII., his benefactor. Urban had scarcely closed his eyes, and Innocent X. ascended the papal throne, when the envy engendered by the merits of the artist and the favor bestowed on him broke forth. His enemies triumphed; but he regained the favor of the Pope by a model for a fountain. About the same time he erected the palace of Monte Citorio. Alexander VII., the successor of Innocent X., required of him a plan for the embellishment of the Piazza di San Pietro. The admirable colonnade, so beautifully proportioned to the Basilica, was built under the direction of Bernini. We may also mention the palace Odescalchi, the Rotunda della Riccia, and the house for novices, belonging to the Jesuits, on Monte Cavallo. Louis XIV. having invited him to Paris, he set out from Rome, in 1665, accompanied by one of his sons and a numerous retinue. Never did an artist travel with so great pomp and under such flattering circumstances. The reception which he met with in Paris was highly honorable. He was first occupied in preparing plans for the restoration of the Louvre, which, however, were never executed. Cardinal Rospigliosi having become Pope, Bernini was admitted to an intimate intercourse with him, and charged with several works; among others, with the decoration of the bridge of St. Angelo. In his 70th year this indefatigable artist executed one of his most beautiful works, the tomb of Alexander VII. He was buried with great magnificence in the church of St. Maria Maggiore. To his children he left a fortune amounting to about 3,300,000 francs. Bernini's favorite maxim was, *Chi non esce talvolta della regola, non passa mai*. Thus he was of opinion that,

in order to excel in the arts, one must rise above all rules, and create a manner peculiar to one's self.

Bernis, François Joachim de Pierres de, bār-nes, frôn-swa jô-â-kēm dē pē-âr dē, French cardinal and minister of Louis XV.: b. St. Marcel, de l'Ardeche, 1715; d. Rome, 2 Nov. 1794. Madame de Pompadour presented him to Louis XV., who, being pleased with him, assigned to him an apartment in the Tuileries, with a pension of 1,500 livres. He went as ambassador to Venice, and after his return enjoyed the highest favor at court, and soon became minister of foreign affairs. The political system of Europe was changed at that time. France and Austria, hitherto enemies, united in an offensive and defensive alliance, which was succeeded by the Seven Years' war, so unfortunate for France. Bernis has been designated by several writers as the chief author of this alliance. Duclos, however, asserts that it was the intention of Bernis to maintain the old system, which, since the time of Henry IV., and especially since the time of Richelieu, had made France the protectress of the less powerful states of Germany, and the rival of Austria. Oppressed by the misfortunes of his country, which, in part at least, were ascribed to him, Bernis surrendered his post, and was soon after banished from court. His disgrace lasted till the year 1764, when the king appointed him Archbishop of Albi, and, five years later, ambassador to Rome. Here he remained till his death. In the name of his court, and against his own opinion, he labored to effect the abolition of the order of the Jesuits. When the aunts of Louis XVI. left France in 1791 they fled to him for refuge, and lived in his house. The Revolution deprived him of his fortune, and the means of indulging his generous disposition. The easy poetry of youth had procured him a place in the French Academy, but he himself is its severest critic. Voltaire had a great esteem for his talents, his judgment, his criticisms, and his character, as is evident from their correspondence, which, in every other respect, is very honorable to Bernis. A collection of Bernis' works was published in 1797 by Didot, and another in 1825.

Bernissartia, an extinct genus of primitive crocodiles (*Mesosuchia*) of lower Cretaceous (Wealden) age. It resembles the modern crocodiles in the arrangement of the bony plates on the back more nearly than do other contemporary species, but was of quite small size, only three or four feet in length. A complete skeleton was found at Bernissart, in Belgium, and is now mounted in the Brussels Museum.

Bernoulli, bār-noo-ye, or **Bernoulli**, a family which has produced eight distinguished men, who have all cultivated the mathematical sciences with success. The family, emigrated from Antwerp on account of religious persecutions, under the administration of the Duke of Alva, fled first to Frankfort, and afterward removed to Bale, where it was elevated to the highest dignities of the republic.

Bernoulli, Daniel, Swiss philosopher. b. Groningen, 9 Feb. 1700. He studied medicine, in which he took the doctor's degree, and at the age of 24 was offered the presidency of an academy about to be established at Genoa, but in the following year accepted an invitation to St. Petersburg. Accompanied by his younger brother

John, he returned to Bâle in 1733; became there professor of anatomy and botany; in 1750 professor of natural philosophy; resigned this place, because of his advanced age, to his brother's son, the younger Daniel Bernouilli, in 1777, and died in 1782. He was one of the greatest natural philosophers as well as mathematicians of his time. At 10 different times he received a prize from the Academy of Paris. In 1734 he shared with his father a double prize, given by this academy for their joint essay on the causes of the different inclinations of the planetary orbits. Most of his writings are contained in the Transactions of the St. Petersburg, Paris, and Berlin academies, of which he was a member.

Bernouilli, Jakob, or **James**, Swiss mathematician: b. Bâle, 1654; d. 1705. The differential calculus discovered by Leibnitz and Newton was applied by him to the most difficult questions of geometry and mechanics; he calculated the loxodromic and catenary curve, the logarithmic spirals, the evolutes of several curved lines, and discovered the "numbers of Bernouilli," as they are called.

Bernouilli, Johann, Swiss mathematician: b. Bâle, 1667, d. 1 Jan. 1748. He was one of the greatest mathematicians of his time, and the worthy rival of Newton and Leibnitz. He was destined for commerce, but his inclination led him to the sciences, and from the year 1683 he principally devoted himself to medicine and mathematics. To him and his brother James we are indebted for an excellent treatise on the differential calculus. He also developed the method of proceeding from infinitely small numbers to the finite, of which the former are the elements or differences, and called this method the *integral calculus*. In 1690-2, he made a journey to France, where he instructed the Marquis de l'Hôpital in mathematics. At this time he discovered the exponential calculus, before Leibnitz had made any communications respecting it, and made it known in 1697. In 1694 he became doctor of medicine at Bâle, and in 1695 went, as professor of mathematics, to Groningen, where he discovered the mercurial phosphorus or luminous barometer, for which he received, from King Frederick I. of Prussia, a gold medal, and was made a member of the academy in Berlin, afterward of that in Paris. After the death of his brother in 1705, he received the professorship of mathematics at Bâle, which he held until his death.

Bernouilli, Nicolas, nephew of Johann Bernouilli, Swiss mathematician: b. Bâle, 1687; d. 1759. He studied law, but more particularly devoted himself to mathematics; in 1705 went to Groningen to Johann Bernouilli; returned however with him to Bâle toward the close of the year, and became there professor of mathematics. He traveled through Switzerland, France, Holland, and England, and in 1713 became a member of the Academies of Science in London and Berlin. On the recommendation of Leibnitz he went as professor of mathematics to Padua in 1716, but returned to his native city in 1722 as professor of logic. In 1731 he became professor of the Roman and feudal law in that place.

Bernouilli, Nicolas, Swiss jurist, son of Johann Bernouilli: b. Basel, 1695; d. St. Pe-

tersburg, 1726. He was professor of jurisprudence at Bern and subsequently professor of mathematics at St. Petersburg.

Bernstein, bĕrn'stĭn, Aaron, German publicist and novelist: b. Dantzic, 1812; d. 1884. He was in politics a Radical, and in religion a reformer, and his life was a continued battle against obscurantism and conservatism. Yet he wrote some charming stories of life among the Jews, among them 'Mendel Gibbor' (1860). He wrote also some notable historical sketches, as 'The People's Years' and 'The Years of Reaction.'

Bernstein, Eduard, leader of the German social democracy: b. Berlin, 6 Jan. 1850. As a young man he edited socialistic newspapers in Berlin until the vehemence of his opposition to the government of Bismarck made it desirable for him to leave Germany. Returning in 1901, he became editor of *Vorwärts*. He contends that every movement for the advancement of the people should be encouraged and taken advantage of by the common people, whom he urges to take an active part in politics. Besides his newspaper work, he has published several volumes of discussions on politico-economical subjects, such as 'Zur Geschichte und Theorie des Sozialismus' (1900).

Bernstorff, Andreas Peter, bĕrn'stōrf, and-rā-as pā'ter (COUNT), Danish statesman. b. 1735; d. 1797. He was appointed prime minister in 1769, when he ceded to Russia the Gottorp part of Holstein in exchange for Oldenburg and Delmenhorst. He introduced a new system of finance, and prepared the abolition of villanage in Schleswig and Holstein. He was a pronounced Liberal, and contended for the freedom of the press.

Bernstorff, Johann Hartwig Ernst (COUNT), Danish statesman in the service of the king of Denmark: b. Hanover, 1712; d. 1772. He was employed in divers embassies, and afterward held the office of foreign minister to Frederick V. for about 20 years, resigning in 1770. He was called by Frederick the Great "the oracle of Denmark."

Beroaldo, bā-rō-āl'dō, Filippo, Italian scholar: b. Bologna, 1453; d. 1505. He early gave proofs of great abilities and a prodigious memory, and after completing his education opened a school, successively at Bologna, Parma, and Milan, and taught with great success. He afterward went to Paris, and gave lectures which greatly extended his fame. His townsmen now became desirous to possess him, and he returned to Bologna, where he spent the remainder of his life as professor of belles-lettres. He is now chiefly known as the editor of some good editions of the classics, and the author of a curious tract entitled 'Declamatio Ebriosi, Scortatoris et Aleatoris,' in which the drunkard, rake, and gambler, represented as three brothers, debate which of them, as being the most vicious, should be excluded from sharing in his father's inheritance.

Bero'e, daughter of Oceanus; also the name of several women connected with Thrace, Illyria, etc.; also a genus of animals, the typical one of the family *Beroidæ*. The beroes are oval or globular-ribbed animals, transparent and gelatinous, with cirri from pole to pole, and two long tentacles fringed with cirri, which aid them in breathing and in locomotion. They have a

mouth, a stomach, and an anal aperture. They are free swimming organisms inhabiting the sea, sometimes rotating, and at night phosphorescent.

Bero'sus, according to some a Chaldæan by birth, and a priest of the temple at Belus at Babylon, and according to others a contemporary of Alexander the Great, is celebrated both as a historian and an astronomer, though it has been alleged that his name merely has been used for the purpose of giving a reputation to what others had written. His history, giving an account of the Babylonian Chaldæans and their kings, consisted of two books written in Greek, and professed to be founded on the ancient archives of the temple of Belus. It exists only in fragments, contained in the writings of Josephus, Eusebius, and others, and given in a collected form by Richter (1825). According to Pliny the astronomical observations contained in the works of Berosus extended over a period of 480 years.

Berquin, Arnaud, bēr-kăn', ār-nō, French writer: b. Bordeaux, 1749; d. 1791. He first attracted notice by some poems which he entitled 'Idylles,' and by several translations from the English under the name of 'Tableaux Anglais,' but is best known by his work entitled 'Ami des Enfants,' for which he received the prize of the French Academy in 1789, as the most useful work which made its appearance during that year. It has been translated into most European languages, and still continues a standard work for the amusement and instruction of young people. It cannot, however, lay claim to the merit of originality, as both the title and much of the substance are derived from a work in German by Weiss, entitled 'Kinderfreund.' Berquin, though specially devoted to the instruction of youth, was not incapable of excelling in graver literature, and was for some time the editor of the *Moniteur*.

Berquin, ber-kañ', Louis de, the first Protestant martyr in France: b. 1490; d. Paris, 17 April 1529. He was a gentleman of Artois, a friend of Badius, the savant. When, in 1523, the police began to seize Luther's works, with a view to suppressing Protestantism, they found among Berquin's books some manuscripts of his own writing that were pronounced heretical. As he refused to retract, he was thrown into prison. Francis I., whose counselor he was, obtained for him his freedom; and Erasmus, always his friend, tried in vain to prevent him from exposing his life in a useless struggle. His fixed opinions and intrepid nature, however, having thrown him into prison three times, caused him to be condemned to death, and he was burned alive.

Berredo e Castro, bār-rā'dō ē kăsh'trō, Portuguese soldier and historian: b. Serpa, about 1680; d. Lisbon, 13 March 1748. Having entered the army he fought at the battle of Saragossa (1710), so distinguishing himself on that occasion that he was made governor-general of the province of Maranhão, Brazil, and in 1718 he became captain-general of Mazagao. The rest of his life was spent upon his history which is of great value as an original source of information for the period of which it treats. It is entitled 'Annals Historicos, do estado do Maranhão' (1749).

Berret'ta. See VESTMENTS.

Ber'rian, William, American Episcopal clergyman and writer: b. New York, 1787; d. 7 Nov. 1862. He was rector of Trinity Church, New York, 1830-62. Besides various religious works, he wrote 'Travels in France and Italy' and a 'Historical Sketch of Trinity Church.'

Ber'rien, John Macpherson, American lawyer and politician: b. New Jersey, 23 Aug. 1781; d. Savannah, Ga., 1 Jan. 1856. He was the son of an officer in the war of the American Revolution, graduated at Princeton in 1796, was admitted to the bar of Georgia at the age of 18, and gradually rose in reputation till he was elected, in 1809, solicitor of the eastern district of Georgia. He became judge of the same district the next year, retaining the latter office till 1822, when he entered the Georgia Senate, from which he was transferred, in 1824, to the Senate of the United States. He established in that body a high reputation as an orator and statesman, was appointed attorney-general of the United States in 1829, resigned this office in 1831 when Gen. Jackson's cabinet became inharmonious, resumed the practice of his profession in Savannah till 1840, when he was elected again to the national Senate, and was re-elected in 1846.

Berro, Bernardo Prudencio, bār'rō, bēr-nar'dō pru-dēn'cē-o, Uruguayan statesman: b. Montevideo, about 1800; d. April 1868. In 1852 he was vice-president and president of the senate. Under Giro he was minister of government till the revolution of 1853; again president of the Senate in 1858, and president of the republic in 1860-4. The revolution of Flores was successful soon after the expiration of his term. In 1868 he stirred up a revolt against Flores, was imprisoned, and soon afterward shot through a window in his cell.

Berrugete, bēr-roo-gā'te, Alonzo, Spanish painter, architect, and sculptor: b. Paredes de Nava, Spain, 1480; d. Toledo, 1561. He went in early life to Italy, studied in the school of Michael Angelo, and became intimate with Andrea del Sarto, Baccio Bandinelli, and other celebrated artists. On his return he was appointed painter to Charles V. His principal architectural works are the royal palace at Granada, and the town-house of Seville; his skill as a sculptor is seen to great advantage in the choir of the cathedral of Toledo, and the tomb of the vice-chancellor of Aragon at Saragossa. His best paintings are at Valladolid, Toledo, and Salamanca.

Berry, bā-re, Carolina Ferdinanda Louisa, Duchesse de, widow of the second son of Charles X. of France; daughter of Ferdinand I. of the Two Sicilies: b. 5 Nov. 1798; d. 17 April 1870. Her futile attempt at insurrection in 1832, to place her son on the French throne, caused her imprisonment and subsequent withdrawal to Sicily.

Berry, Charles Ferdinand, Duc de, second son of the Count d'Artois (afterward Charles X.) and Maria Theresa of Savoy: b. Versailles, 24 Jan. 1778; d. 14 Feb. 1820. He was educated along with his elder brother, the Duke of Angoulême. In 1792 he fled with his father to Turin, served under him and Condé on the Rhine, and early learned the art of winning the love of the soldiers. Subsequently he lived alternately in London and Scotland, continually occupied with plans for the restoration of the

Bourbons. Landing at Cherbourg, 13 April 1814, he passed through the cities of Bayeux, Caen, Rouen, etc., gaining over the soldiers to the cause of the Bourbons, distributing alms, and delivering prisoners. When Napoleon landed from Elba, the king committed to Berry the chief command of all the troops in and around Paris. All his efforts to secure their fidelity proving ineffectual, he was obliged to retreat on the night of 10 March, with the troops of the household to Ghent and Alost, where the king then was. The battle of Waterloo enabled him to return to Paris, where he arrived 8 July, and surrendered his command over the troops of the household into the hands of the king. At the opening of the chambers in Paris he took the oath to maintain the constitution, and was appointed president of the fourth bureau; but soon retired from public life. He died of a blow inflicted by a political fanatic named Louvel (see LOUVEL). The duke left a daughter, Louise Marie Thérèse, afterward Duchess of Parma; and a posthumous son, subsequently known as Count de Chambord.

Ber'y, Hiram George, American soldier: b. Rockland, Me., 27 Aug. 1824; d. Chancellorsville 2 May 1863. He entered the Union army as colonel of the 4th Maine infantry, and was present at the battle of Bull Run, the siege of Yorktown, took a conspicuous part in the battles of Williamsburg, Fair Oaks, Chantilly, and the second Bull Run campaign. President Lincoln nominated him a major-general of volunteers, January 1863, and he succeeded Gen. Sickles in command of the 2d division of the 3d army corp. At a critical point in the battle of Chancellorsville, 1 May 1863, Hooker ordered Gen. Berry to charge with the bayonet the advancing enemy. He did so, and for three hours his division, almost alone withstood the enemy's assault, and regained for the Federal forces a portion of their lost ground. He was killed at the head of a successful bayonet charge, upon the renewal of the battle the following day.

Berry, Mary, English author: b. Kirkbridge, Yorkshire, 16 March 1763; d. London, 20 Nov. 1852. She and her sister Agnes were intimate friends of Horace Walpole. In 1798 she edited the 'Works of Horace Walpole'. Her most ambitious work was her 'Social Life in England and France' (1844).

Ber'ry, or Berri, a former province and dukedom of France, of which Bourges was the capital. With the exception of the arrondissement St. Amand, which belonged to the Bourbonnais, it now forms the departments Indre and Cher. At several periods it gave a title to French princes, the younger son of Charles X. being the last to assume it.

Berry, Canal de, one of the most important canals in France as regards the amount of its traffic. It begins at Montluçon on the Cher, the chief trading centre of the coal fields of the Allier; descends the Cher valley to St. Amand, and ultimately enters the Cher itself near St. Aignan, below which point the canalized Cher continues the line of navigation to Tours. Length of navigation 200 miles, of which 36½ miles belong to the canalized Cher. Constructed 1807-41.

Berry, a succulent fruit in which the seeds are immersed in a pulpy mass enclosed in a thin

skin; for example, grape, gooseberry, tomato. Popularly the term is applied to fruits not strictly berries; for example, strawberry, raspberry, etc., which bear external seeds on a pulpy receptacle.

Berryer, bār-yā, Antoine Pierre, French advocate and orator: b. Paris, 4 Jan. 1790; d. 29 Nov. 1868. In 1814 he proclaimed at Rennes the deposition of Napoleon, and remained till his death an avowed Legitimist. He assisted his father in the defense of Ney, secured the acquittal of Gen. Cambronne, and defended Lamennais from a charge of atheism. His eloquence was compared with that of Mirabeau, and after the dethronement of Charles X. (1830) he remained in the chamber as the sole Legitimist orator. In 1840 he was one of the counsel for the defense of Louis Napoleon after the Boulogne fiasco. In 1843 he did homage to the Count de Chambord in London, adhering to him through the revolution of 1848, and voting for the deposition of the prince-president the morning after the *coup d'état*. He gained additional reputation in 1858 by his defense of Montalembert, and was counsel for the Patterson-Bonapartes in the suit for the recognition of the Baltimore marriage. In 1863 he was re-elected to the chamber with Thiers, and in 1864 received a flattering reception in England.

Bersaglieri, bër-sa-lyā're, a corps of riflemen or sharpshooters, introduced into the Sardinian army by Gen. Della Marmora, about 1849. They took part in the Russian war and also assisted at the battle of the Tchernaya, 16 Aug. 1855. They were likewise employed in the Italian wars of 1859 and 1866. In 1901 they comprised 12 regiments, each regiment composed of three battalions of four companies each.

Ber'serker, a descendant of the eight-handed Starkader and the beautiful Alfhilde, and according to the Scandinavian mythology, a famous warrior. He disdained the protection of armor, whence he received his name, which signifies, according to Ihre, armorless. He raged like a madman in battle. He killed King Swafurlam, and married his daughter, by whom he had 12 sons as untamable as himself. They were also called Berserker, and after their time the name was given to wild and fierce Scandinavian warriors.

Bersezio, ber-sets'yō, Vittorio, Italian novelist and playwright: b. Peveragno, Piedmont, 1830. Both as a writer of tales and of comedies he is conspicuous for vivid and faithful delineation of Piedmontese life; especially in his dialect comedies, among which 'The Misfortunes of Monssù Travett' is considered to be his masterpiece. He also wrote an excellent historical work, 'The Reign of Victor Emmanuel II.' (1878-93).

Bersier, bār-syā, Eugène Arthur François, a French Protestant pulpit orator of note: b. Morges, near Geneva, 1831; d. Paris, 19 Nov. 1889. He became in 1855 a preacher in Paris where he was much admired and his sermons were translated into several languages. Among his writings are 'Coligny avant les guerres de religion' (1884); 'Histoire d'une petite fille heuveuse' (1890); in English, 'Sermons' (1881-1901). See Tinling, 'An Analysis of the Published Sermons of Pastor Eugène Bersier' (1901).

BERT — BERTHOLLET

Bert, bär, Paul, French statesman and physiologist: b. Auxerre, 17 Oct. 1833; d. Ketcho, Tonquin, 11 Nov. 1886. He studied both law and medicine, became assistant to Claude Bernard at the College of France, and successively occupied the chairs of physiology at Bordeaux and Paris. Entering political life in 1870, on the proclamation of the republic, he was four times re-elected to the chamber. He brought forward laws removing primary instruction from the control of the religious orders, and making it compulsory. During the premiership of Gambetta he held the post of minister of public instruction and worship. While engaged in public life, M. Bert still pursued with ardor his scientific investigations, attracting world-wide attention by his experiments in vivisection. The anti-religious views of M. Bert excited much controversy. He was also the author of several works on anatomy and physiology, and of numerous educational and political writings. He rendered a service to natural science by the clear and simple style of his text-books.

Berthelot, bär-tlō, Pierre Eugene Marcelin, French chemist: b. Paris, 25 Oct. 1827. He early studied chemistry, and in 1859 was appointed professor of organic chemistry in the Superior School of Pharmacy. In 1865 a new chair of organic chemistry was organized for him in the College of France. In 1870 he was elected president of the scientific committee of defense, and during the siege of Paris was entrusted with the manufacture of ammunition and guns, and especially dynamite and nitroglycerine. In 1878 he became president of the committee on explosives, which introduced smokeless powder. His labors also led to the discovery of dyes extracted from coal tar. He received the decoration of the Legion of Honor in 1861; was made commander in 1879, and grand officer in 1886. In 1889 he was elected permanent secretary of the Academy of Sciences. He has contributed to the knowledge of synthetic processes and to the relations between the phenomena of heat and of chemistry. His works include 'Chimie organique fondée sur la synthèse' (1860); 'Leçons sur les principes sucrés' (1862); 'Leçons sur l'isomerie' (1865); 'Traité élémentaire de chimie organique' and 'Sur la force de la poudre et des matières explosives' (1872 and 1889); 'Vérifications de l'aréomètre de Baume' (1873); 'Les Origines de l'alchimie' (1885); 'Collection des anciens alchimistes grecs' (1888); 'Chimie des anciens' (1889); 'Traité pratique de calorimétrie chimique' (1893).

Berthier, bär-tyā, Louis Alexandre, marshal of France, prince and duke of Neufchâtel and Valengin, prince of Wagram: b. Versailles, 20 Nov. 1753; d. Bamberg, 1 June 1815. In the American war of independence he served under Lafayette. In 1789, Louis XVI. appointed him major-general of the national guard of Versailles, and on 5 and 6 Oct. 1790, as well as 19 Feb. 1791, he did good service to the royal family. During the reign of terror he avoided suspicion by exhibiting zeal in the Vendean war. After the 9th Thermidor, he was appointed chief of the general staff of Kellermann, and by causing the French army to take up the lines of Borghetto, contributed to arrest the advance of the enemy. Thus his reputation as a chief of the general staff was established before Bona-

parte singled him out for that post. In October 1797 Gen. Bonaparte sent him to Paris to deliver to the directory the treaty of Campo-Formio. In 1798 he received the chief command of the army of Italy, and in the beginning of February made his entrance into Rome, abolished the papal government, and established a consular one. After the 18th Brumaire, Bonaparte appointed him minister of war. He afterward became general-in-chief of the army of reserve, accompanied Bonaparte to Italy in 1800, and contributed to the passage of St. Bernard and the victory of Marengo. He signed the armistice of Alessandria, formed the provisional government of Piedmont, and went on an extraordinary mission to Spain. He then received again the department of war, which, in the meantime, had been in the hands of Carnot. He accompanied Napoleon to Milan, June 1805, to be present at his coronation, and in October was appointed chief of the general staff of the grand army in Germany. In the campaign against Austria in 1809, he distinguished himself at Wagram, and received the title of Prince of Wagram. In 1810, as proxy of Napoleon, he received the hand of Maria Louisa, daughter of the Emperor Francis I, and accompanied her to France. Somewhat later Napoleon made him colonel-general of the Swiss troops. In 1812 he was with the army in Russia, as chief of the general staff, which post he also held in 1813. After Napoleon's abdication he lost his principality of Neufchâtel, but retained his other honors, and possessed the favor and confidence of Louis XVIII. Subsequently he retired to Bavaria, where, in a fit of insanity, he committed suicide. See 'Mémoires d'Alexandre Berthier, Pr. de Neufchâtel et de Wagram' (1826).

Berthold, bër'tōlt, Franz, pseudonym of **Adelheid Reinbold**, German novelist: b. 1802; d. 1839. She was warmly appreciated and furthered by Ludwig Tieck. Her story 'Fred of the Will-o'-the-Wisp' (1830), met with great favor; after her death appeared 'King Sebastian' (1839), a historical romance, and 'Collected Tales' (1842).

Berthold von Regensburg, bër'tōlt fōn rä-gëns-boorg, German Franciscan preacher: b. about 1220; d. 13 Dec. 1272, and buried in the Franciscan convent at Ratisbon, of which he was a member. From 1250 to the close of his life, he preached to immense congregations in Switzerland, Hungary, Austria, Moravia, Bohemia, Saxony, Swabia, etc., speaking to them from the summits of mountains or from the tops of trees. In the Heidelberg university library some MSS. of his sermons are preserved. The eloquent manner with which he exposed the iniquities of his times seems to have produced an electric effect upon his hearers. Near Glatz, in Silesia, a tent under which he had preached was exhibited long after his death, and revived the feelings of affection and reverence in which his name is held by the people. See 'Life by Unkel' (1882).

Berthollet, bär-tō-lā, Claude Louis (COUNT), French chemist of distinction: b. Talloire, Savoy, 9 Dec. 1748; d. Paris, 7 Nov. 1822. He studied medicine at Turin; went to Paris, where he became connected with Lavoisier, was admitted in 1780 a member of the Academy of Sciences in that city; was made in 1794 professor in the normal school there, and was sent to

BERTHOLLETIA — BERTILLON SYSTEM

Italy in 1796, in order to select the plunder that was to be carried to Paris. He followed Bonaparte to Egypt, and returned with him in 1799. After the 18th Brumaire he was made a member of the *senat-conservateur*; afterward count and grand-officer of the Legion of Honor. In 1804 Napoleon appointed him senator for the district of Montpellier. In 1813 he received the grand cross of the Order of the Reunion. He voted, however, for the establishment of a provisional government and the dethronement of Napoleon. Louis XVIII. made him a peer; but Napoleon passed him by in 1815. After the restoration of Louis, he took his seat again in the chamber of peers. Among the inventions and new processes with which the sciences and the arts were enriched by him, the most important are those for the charring of vessels to preserve water in ships, for the stiffening and glazing of linen, for the artificial production of nitre, etc., but principally that for the bleaching of vegetable substances by means of chlorine, which, since 1786, has been in general use in France. Besides different essays in the collections of the Academy and the Institute, he has written several larger works, among which his 'Essai de Statique Chimique' (1803; translated into English, German, and Italian) must be considered as the most important. The complicated phenomena of chemistry were here treated as under the strict and simple laws of mechanics. He had also a large share in the reformation of the chemical nomenclature, as well as in the publication of the work that appeared on this subject in Paris, 1787—'Méthode de Nomenclature Chimique.'

Bertholletia, ber-thōl-lē'shī-a, the generic name of Brazil nut (q v)

Berthoud, bār-too, **Ferdinand**, Swiss mechanician, celebrated for his marine chronometers: b. Plancemont, Neuchâtel, 19 March 1727; d. 20 June 1807. His father caused him to be instructed in the art of watchmaking, and, to afford him an opportunity of perfecting his knowledge, sent him to Paris. He resided in this city from 1745, and there made his first marine chronometers, which have been used by French navigators on so many occasions for extending and correcting geographical knowledge. He left several works relating to his art. His nephew, Louis Berthoud, his pupil and the heir of his talents, extended his improvements still further. His chronometers came to be very widely used by French navigators, and were even more convenient than those of his uncle.

Bertie, Willoughby, fourth Earl of Abingdon, English politician: b. 16 Jan 1740; d. 26 Sept. 1799. He was a vigorous opponent in the House of Lords of the policy of England toward the American colonies that culminated in the Revolution; wrote a famous and very popular tract called 'Thoughts on Mr. Burke's Letter on the Affairs of America,' was active in promoting favorable legislation for Ireland, and sympathized with the French Revolution.

Bertier, bār-tyā, **Francisque Edouard**, French painter, now living in London: b. Paris, 1841. He was a pupil of Bouguereau and Caband, and among his many portraits of notables are those of De Lesseps, Grand Duchess Olga, Countess of Warwick, Prince of Wales, and Max O'Rell. He has several times visited the

United States in order to paint the portraits of prominent American society leaders.

Bertillon, bār-te-yōn, **Alphonse**, French anthropologist: b. Paris 1853. He is widely noted as the founder of a system of identification of criminals. In 1880, while chief of the bureau of identification in the prefecture of police, he established his system of measurements which has given results marvelous for their precision. The system has since been adopted by the police authorities of the large cities of Europe and the United States. He was one of the expert witnesses in handwriting in the trial of Capt. Dreyfus in 1899, and soon after its close was removed from his office. He is author of numerous works bearing upon his system, including 'Identification anthropometrique' (1893); 'La Comparaison des écritures et l'identification graphique' (1897). See BERTILLON SYSTEM.

Bertillon System, a plan of identifying suspected criminals, invented March 1879, and set forth in 1885 by Dr Alphonse Bertillon of Paris. Properly speaking, it is not a single system, but a combination of one invented by himself with two others approved by use, or as many more as the officers choose to employ for security. The former is that of anthropometry, or exact measurements of certain dimensions of the human body and its members; the latter are those of description—as in passports, but more extended, more precise, and with a better terminology—and photography, with still others at will. The first-named is the heart of the system, the feature which makes it instantly available; its accuracy is great, but so is that of some others; this however is the only one which can be indexed and referred to as readily as the titles of books in a library catalogue. For this reason it is rapidly becoming the standard in all countries with civilized judicial systems. It rests on three principles: (1) Easy and exact measurement of the parts of the body in a living subject; (2) extreme diversity of such dimensions in different subjects, no two ever closely approximating each other; (3) almost absolute fixity of the skeleton after 20. The measurements are taken with compasses, and include: Height, standing and sitting, reach of outstretched arms; length and width of head; length and width of right ear; length of left foot, forearm, middle and little fingers. The descriptive elements are color of eyes (the most important detail of all, as it never changes and is impossible to disguise), hair, beard, and complexion; deformities and peculiarities of shape; marks on body, as moles, scars, the tattooings frequent among criminals, etc., carefully located—as "mole six centimetres to left of fifth vertebra," or "horizontal scar on back of second phalanx of right forefinger, three millimetres below middle." A photograph of full face and one of profile are taken when thought desirable, from a fixed chair and a fixed camera. The entire process, by a measurer and a secretary who writes from dictation, takes five to seven minutes, and the measurements are correct to one thirty second of an inch. Descriptions and photograph are put together on cards of uniform size, and in the great Paris collection of 120,000,—the model for all others,—are thus classified for reference. First, approximately 20,000 females and 10,000 minors

BERTIN — BERTRAND

are separated for special classification. Second, the 90,000 remaining are divided into three equal sections according to length of head: short heads, of 187 millimetres and less; medium, 187 to 194; long, 194 and above. Experience proves that these make very closely equal numbers; and their cards are placed in three tiers of drawers, the short heads uppermost. Each of these is subdivided into three of 10,000 according to width of head, without further reference to length; each of these into three of about 3,300, according to length of middle finger; each of these into three of 1,100, by length of foot; these are subdivided successively by length of forearm, full height, length of little finger, and color of eyes. These last groups contain from 12 to 14, and are classed by length of ear. The women and children are similarly classified. Thus any new measurement can be compared with its duplicate, in this enormous mass, or the absence of such record shown, with marvelous celerity and almost infallible accuracy. Its index value alone is of the first order. Under the old systems, the entire mass of descriptions and photographs had to be searched and compared with any given arrested person, and with the immense number accumulating in great cities it became physically impossible to apply it with any certainty, the senses grew so jaded and resemblances were so many; not only did the guilty escape,—it was estimated that more than half the habitual criminals remained undetected,—but the innocent were often mistaken for them. International criminals, like bank robbers and pickpockets, traveled from one city and country to another under assumed names and disguises; sometimes, when wanted for grave crimes, they committed trivial misdemeanors to be arrested and imprisoned under false names. This is now rendered futile by the combination of anthropometry with the descriptive features; and with regard to the confusion of identity, the laws of probability render it practically impossible. The system is also of great value in distinguishing new criminals from old offenders: it not merely registers identity, but the fact of a first offense. It has strengthened even the old descriptive system, by giving it a more precise vocabulary and training the officers of the law in physiognomy. It has already done admirable work, as in the discovery of King Humbert's murderer; but to make it more efficient, the local records should be gathered into national and even international bureaus. With a proper enforcement of habitual-criminals' acts, a great step would be taken toward suppressing the class of professional felons. This has been mooted in our own country, where it was introduced in 1887 by Maj. R. W. McClaughry; that it has not been fully adopted here is one reason for the infesting of the country by professionals driven out of Europe by the system. Bertillon has fully described his system in his 'Identification Anthropométrique' (1893); and Maj. McClaughry has edited 'The Bertillon System of Identification' (1896).

Bertin, bār-tān, Antoine, French poet: b. Isle of Bourbon, 1752; d. San Domingo, 1790. He was much admired by his contemporaries, who, somewhat extravagantly, styled him the French Propertius. He was a friend of Parny, and like him excelled in elegiac and epistolary verse. His principal works are 'Voyage in Burgundy' (1777); and 'The Loves' (1780).

Bertin, Louise Angelique, French musician and composer: b. Les Roches, near Bievres, 15 Jan. 1805; d. Paris, 26 April 1877. She was a daughter of L. F. Bertin (q.v.), and composed 'Faust,' 'Esmeralda,' 'Guy Mannering,' and other operas. Her volume of verse, 'Les Glanes' (1842), received the prize of the Academy.

Bertin, Louis François (called BERTIN L'AÎNÉ), French journalist; b. Paris, 14 Dec. 1766; d. 13 Sept. 1841. The Revolution made him a journalist, and in 1799 he started the famous *Journal des Débats*. His royalist principles offered Napoleon, and cost him imprisonment and banishment to Elba; thence, however, he escaped to Rome, where he formed a friendship with Châteaubriand. In 1805 he returned to Paris, and resumed the editorship of the *Débats*, but was much hampered by Napoleon. The second restoration of the Bourbons restored once more to Bertin the free control of his journal, and henceforward he gave almost constant support to the ministerial party. He supported the July monarchy, and edited the *Débats* till his death.

Bertin, Nicolas, French artist: b. Paris, 1668; d. 1736. His picture, 'The Building of the Ark,' obtained the grand prize, in 1685, and 'Prometheus Liberated by Hercules' brought him, in 1705, membership in the Academy, where he became professor in 1715. His paintings will be found in the galleries of Dresden, Stockholm, St. Petersburg, Antwerp, Amsterdam, Orleans, and Toulouse.

Bertini, Giuseppe, bër-tē'ne, gwē'sēp, Italian painter: b. Milan, 1825; d. 1898. The Milan Academy awarded him the prize for the best historical picture in 1845, and his painting on glass of 'Dante and the Divine Comedy,' exhibited in London in 1853, has been greatly admired. He became professor of painting at the Academy in 1860. Among notable pictures by him are: 'The Vision of Saint Francis of Assisi'; 'Death of Saint Joseph'; 'Tasso Introduced to the Duke of Ferrara.'

Bertrand, Henri Gratien, bārtran, ōn-rē gra-tyān (COUNT), French military officer: b. Châteauroux, 1773; d. there, 31 Jan. 1844. He distinguished himself at Austerlitz and became Napoleon's adjutant; and, after the battle of Aspern, in 1809, for his share in saving the French army by bridges, was created count and governor of Illyria. After serving with credit in the subsequent campaigns, he retired with the emperor to Elba, was his confidant in carrying out his return to France, and finally shared his banishment to St. Helena. On Napoleon's death, Bertrand returned to France, where, though sentence of death had been pronounced upon him, a sentence which Louis XVIII. had wisely recalled, he was restored to all his dignities, and, in 1830, appointed commandant of the Polytechnic School. In 1840, he formed part of the expedition which brought back the remains of Napoleon to France.

Bertrand, James, French historical painter: b. Lyons, 1825; d. 1887. He studied in Rome, and his 'Saint Benedict Taking Communion,' exhibited at the Salon in 1859, was highly approved. He worked in the classical style, and his paintings are as notable for their careful finish as for their religious tone. They have

BERTRAND — BERWICKSHIRE

been frequently engraved. Among them are 'Death of Virginia' (1869); 'Charlotte Corday's Last Day' (1883); 'Calvary' (1884).

Bertrand, Joseph Louis François, bār-trān, jō-séf loo-ē frōn-swa, French mathematician: b. Paris, 1822; d. 1900. He taught at the Polytechnic and Normal schools, and the College de France, and in 1884 became a member of the French Academy. He wrote treatises on arithmetic, algebra, calculus, thermodynamics, and probabilities, and in 1881 was appointed commander of the Legion of Honor.

Bérulle, bā-rul, Pierre de, French cardinal: b. near Troyes, 4 Feb. 1575; d. Paris, 2 Oct. 1629. He early showed remarkable mental acuteness and knowledge, and became distinguished for skill in controversy. He instituted, and was the first superior of, the order of Carmelites in France, and also founded the congregation of the Oratory in spite of the opposition of the Jesuits. He was a statesman as well as priest, and took a leading part in politics. He was often opposed to Richelieu, whose jealousy he excited, and who could not conceal his satisfaction at the news of his death. He accompanied the Princess Henrietta to England, on her marriage with the Prince of Wales. He shunned elevated positions, and was very unwillingly obliged to accept the hat of a cardinal. This elevation made no difference, however, in his humble way of life, and did not prevent him from sometimes taking part, as he had always done, in the servile work of the religious community to which he belonged. He was also a man of letters, and was the first to appreciate and encourage the genius of Descartes urging him, by his sense of obligation to his Creator, to make known to the world his discoveries. The most noted of his writings is 'Legrandeurs de Jésus'.

Bervic, bār-vek, Charles Clement, French engraver: b. Paris, 1756; d. 1822. The works of Bervic are among the best of the French school, but are not numerous. The most celebrated of them is the full-length figure of Louis XVI., after a picture of Callot. The copies are very rare and dear, because the plate was broken to pieces in the revolutionary tumults of 1793. The exactness of his drawing, the firmness and brilliancy of his touch, the purity and correctness of his design, and the happiness with which he transferred to his plate the beauties of the original, gave a high character to his productions.

Berwick, James Fitz-James (DUKE OF), French marshal: b. Moulins, 1670; d. 1734. He was the natural son of the Duke of York, afterward King James II., and Arabella Churchill, sister of the Duke of Marlborough; and first went by the name of Fitz-James. He received his education in France, and served his first campaigns in Hungary under Charles, Duke of Lorraine, general of Leopold I. He returned to England at the age of 17, and received from his father the title of Duke. On the landing of the Prince of Orange in 1688 he went to France with his father, whom he afterward accompanied on the Irish expedition. He fought bravely and was wounded at the battle of the Boyne, 1 July 1690. He afterward served under Luxembourg in Flanders; in 1702 and 1703 under the Duke of Burgundy; then under Marshal Villeroy, and

was naturalized in France. In 1706 he was made marshal of France, and sent to Spain, where he gained the battle of Almanza, which rendered King Philip V. again master of Valencia. In 1709 he went to take the command in Dauphiné, and the measures which he took to cover this and the neighboring provinces against the superior forces of the Duke of Savoy gained him a great reputation. In 1718 and 1719 he was obliged to serve against Philip V., who from gratitude to the marshal had taken a son of his into his service. On his entrance into the Spanish dominions he wrote to his son, the Duke of Liria, admonishing him to do his duty to his sovereign. At the siege of Philippsburg, on the Rhine, his life was terminated by a cannon-ball. His memoirs were published originally in French, and have gone through two or three editions in English. Consult Wilson, 'Duke of Berwick, Marshal of France' (1883).

Berwick-on-Tweed, England, a seaport town, once forming a county of itself, but now incorporated in Northumberland, on the north or Scottish side of the Tweed, within half a mile of its mouth. It is surrounded by walls which are well preserved, and along which is an agreeable promenade. The streets are for the most part narrow, steep, straggling, and irregular, though some of the principal ones are wide and open. The Tweed is crossed at the town by an old bridge of 15 arches, 1,164 feet long and only 17 wide, and by a magnificent railway viaduct of stone, 667 yards long and 184 feet in extreme height, with 28 semicircular arches. The chief industries are iron-founding, the manufacture of engines and boilers, agricultural implements, feeding-cake, manures of various kinds, ropes, twine, etc. The chief exports are grain, artificial manures, and herrings. A dock affording accommodation for large vessels was opened in 1876. In the beginning of the 12th century, during the reign of Alexander I., Berwick was part of his realm of Scotland, and the capital of the district called Lothian. Soon after this date it became populous and wealthy, was the chief seaport of Scotland, contained a strong castle, with churches, hospitals, and monastic buildings, and was created one of the four royal burghs of Scotland. In 1216 the town and castle were stormed and taken by King John. During the competition between Baliol and Bruce for the Scottish throne the English Parliament sat in Berwick; and in the hall of the castle Edward I. pronounced judgment in favor of Baliol. Bruce retook the town and castle in 1318; but, after undergoing various sieges and vicissitudes, both were surrendered to Edward IV. in 1482, and have ever since remained in possession of England. Pop. (1901) 13,437.

Ber'wickshire, a maritime county of Scotland, nominally divided into the three districts of Lauderdale, Lammermoor, and the Merse or March. The principal rivers of the county are the Tweed, the Leader, the Eye, the Whiteadder, and the Blackadder; and all except the last contain salmon, of which great quantities are shipped from Berwick for London. Vast quantities of agricultural produce are shipped from the ports of Berwick and Eyemouth, and much is also sent to Edinburgh, Dalkeith, Haddington, and Dunbar. Very few manufactures are established in this county, the principal one

BERYL — BESANCON

which it supplies beyond domestic consumption being that of paper. The North Sea fisheries are of great importance. Berwick formerly abounded in strong castles and fortified places, traces of which are to be found everywhere. The county town is Greenlaw. Other small towns are Duns and Eyemouth. Pop. (1901) 30,816.

Beryl, a native silicate of aluminum and the rare metallic element glucinum (or "beryllium"), having the formula $3\text{GIO} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$, and crystallizing in the hexagonal system. It commonly has a specific gravity of 2.70, and a hardness of from 7.5 to 8. A portion of the glucinum is sometimes replaced by lithium, sodium or cesium, and chemically combined water is also occasionally present. In the latter case the formula of the mineral appears to be $\text{H}_2\text{GlaAl}_2\text{Si}_2\text{O}_{11}$. Beryl is usually transparent or translucent, and in color may be green, blue, yellow, white, or light red. A variety which is transparent, and bright green from the presence of oxide of chromium, is known as "emerald," and is highly esteemed as a gem (see GEMS); the "Oriental emerald" (see SAPPHIRE), however, is not a variety of beryl, but a green variety of sapphire. A bluish-green variety of the common beryl, known as "aquamarine," is also used as a gem. Beryl occurs in all parts of the world, being commonly associated with granite. Its crystals are sometimes enormous in size, and two specimens from Grafton, N. H., are known, which weigh 2,900 pounds and $2\frac{1}{2}$ tons, respectively. The finest emeralds (qv) are from Bogota; aquamarines (qv), from Siberia, Brazil, Maine, North Carolina and Colorado; golden beryls, from Connecticut and North Carolina.

Beryllium, a rare metallic element, called "beryllium" from the fact that it was first found in the beryl. Its salts have a sweetish taste, and from this circumstance the element itself has received the name glucinum (qv.).

Beryx, bër'iks, the designation of a genus of deep sea fishes in tropical waters belonging to the group *Berycoidei* and family *Berycidae*. *B. splendens*, deep red with bright streaks, is one of the most beautiful of the Cuban fishes.

Berzelius, ber-tsä'li-us, **Jöns Jakob** (BARON), Swedish chemist of distinction: b Westerlosa, East Gothland, Sweden, 29 Aug. 1779; d. Stockholm, 7 Aug. 1848. The first fruit of his studies, and of a year's residence as assistant to a physician at the famous watering-place of Medewi, was the 'Nova Analysis Aquarum Medevien-sium' (1800). After publishing a tract entitled 'De Electricitatis Galvanicæ in Corpora Organica Effectis' (1802), and taking his doctor's degree, he was appointed by the board of health in 1802 adjunct of medicine and pharmacy in Stockholm. In 1807 he became professor of medicine and pharmacy in Stockholm. Here, along with other medical practitioners, he instituted the Swedish Medical Society. In 1808 he was admitted a member of the Academy of Sciences at Stockholm, in 1810 one of its directors, and in 1818 its perpetual secretary. This office he continued to hold during the remainder of his life. In 1818 the king, while allowing him to retain his own name, made him a noble; and in 1835, on the occasion of his marriage with a daughter of Poppus, a counselor of state, he was named a baron. The existing state of chem-

istry is founded in a great measure on his discoveries and views, though, by the rapid development of the science, the edifice which he erected has undergone many alterations, and several defects have been discovered in it. Hence his views in regard to atomic weights, his electro-chemical theory, and his mode of procedure in organic chemistry, have met with many opponents. He discovered selenium and thorium, first exhibited calcium, barium, strontium, tantalum, silicium, and zirconium in the elemental state, and investigated whole classes of compounds, as those of fluoric acid, the metals in the ores of platinum, tantalum, molybdenum, vanadium, sulphur salts, etc. He introduced a new, or at least a wholly altered nomenclature and classification of chemical compounds. In short, there is no branch of chemistry to which he has not rendered essential service; and his labors are so numerous that, when the accuracy with which they have been executed is kept in view, it becomes almost incomprehensible how one man should have been able to perform them. It ought to be especially mentioned that he never rested satisfied with the bare investigation of isolated facts, but always extended his investigations over a wide field, so as to contribute to the advancement of chemistry as a whole. In addition to his numerous communications to the journals and periodicals of the period, may be mentioned, among his separate works, his 'View of the Composition of Animal Fluids,' 'New System of Mineralogy,' 'Essay on the Theory of Chemical Proportions,' and above all his 'Text-book of Chemistry,' which has been translated into most European languages. As secretary of the Academy of Sciences, he published an annual account of the progress of chemistry and mineralogy, which, having been continued during 27 years, extends to as many volumes. See Soderbaum, 'Berzelius, Werden und Wachsen' (1899).

Berzsenyi, bër'zhā-nyi, **Daniel**, Hungarian poet: b Heyte, 1776; d 1836. An authorized version of his 'Versei' appeared in 1813 and in 1816 was reprinted with his consent and speedily became classic in Hungarian literature.

Bes, an Egyptian god, represented clad in a lion's skin, with the head and skull of the animal concealing his features, and with a dwarfish and altogether grotesque appearance. He was supposed to preside over art, music, the dance, and childbirth.

Besançon, bē-zān-sôn, France, a fortified town, capital of the department Doubs, 206 miles southeast of Paris. The town is surrounded by hills, covered with vineyards. The isthmus or peninsula on which it is built is composed of a mass of rocks crowned by the citadel, which commands the country toward the north, but the citadel itself is commanded by several eminences in the neighborhood, on which forts have been erected for the purpose of securing the approaches. Besançon is one of the strongest towns in France, and also one of the best built. The streets are spacious and well laid out, and the squares are adorned with fountains. The citadel is one of Vauban's finest works. There are here a theatre, a large and valuable public library, a museum, a botanic garden, school of artillery, lyceum, etc. The trade and manufactures are extensive. The latter comprise linen, cotton, woolen, and silk goods, ironmon-

gery, etc.; but the principal industry is watch-making. It employs about 15,000 workmen who make as many as 400,000 watches yearly. There are also extensive foundries, breweries, saw-mills, and tanneries. Besançon is the ancient Vesontio, Besontium, or Bisontium, which is mentioned by Cæsar, who drove the Sequani from it in 58 B.C., as a place of great extent and natural strength. Several of the streets and places still bear their old Roman names, and there are numerous Roman remains, especially a triumphal arch of the Emperor Aurelian, an aqueduct, an amphitheatre, and a large theatre. Pop. (1903) about 59,000.

Besant, bēs-ānt, **Annie**, English theosophist and author: b. London, 1 Oct. 1847. She was married in 1867 to the Rev. Frank Besant, brother of Sir Walter Besant, but was legally separated from him in 1873. She manifested an earnest interest in social and political topics, and, in 1874, became connected with the National Secular Society. Owing to the publication of 'Fruits of Philosophy,' Mrs. Besant was prosecuted, in connection with Charles Bradlaugh (June 1877), but the prosecution failed. Mrs. Besant has since stated her disagreement with the sentiments expressed in this book. In 1883 she announced her adhesion to Socialism. For three years she was a member of the school board of London. She has been prominently connected with various socialistic movements, and a frequent speaker at meetings for workmen, and in 1899 joined the Theosophical Society, and has since been active in theosophical propaganda in Great Britain and the United States. She visited the United States in 1891 and 1892-3 and lectured on Madame Blavatsky and reincarnation, and on theosophy and occultism. Among her numerous publications are 'Reincarnation'; 'Seven Principles of Man'; 'Autobiography'; 'Death and After'; 'Building of the Kosmos'; 'In the Outer Court'; 'Karma'; 'The Self and Its Sheaths'; 'Path of Discipleship'; 'Man and His Bodies'; 'Four Great Religions'; 'The Ancient Wisdom'; 'Three Paths to Union with God'; 'Evolution of Life and Form'; 'Dharma'; 'Avatars'; 'Ancient Ideals in Modern Life'; 'Esoteric Christianity'; 'Thought-Power'; 'The Religious Problem in India'; and in connection with G. R. S. Mead, translations of tracts and reviews.

Besant, bē-zānt', **Sir Walter**, English novelist: b. Portsmouth, England, 14 Aug. 1836; d. London, 9 June 1901. He was educated in London and at Christ's College, Cambridge, where he graduated with mathematical honors. He was for a time professor in the Royal College, Mauritius. His first work, 'Studies in Early French Poetry,' appeared in 1868, and to the field of French literature also belong his 'French Humorists' (1873), and his 'Rabelais' (1877 for the 'Foreign Classics' series). He was for years secretary to the Palestine Exploration Fund, and published a 'History of Jerusalem' (1871) in conjunction with Prof. Palmer, a life of whom he also wrote. The 'Survey of Western Palestine' was edited by him. He is best known by his novels, a number of which were written in partnership with the late James Rice, including 'Ready-Money Mortiboy' (1872); 'This Son of Vulcan';

'The Case of Mr. Lucraft'; 'The Golden Butterfly' (1876); 'The Monks of Thelema'; etc. After Mr. Rice's death (1882) Sir Walter wrote: 'All Sorts and Conditions of Men' (1882), which led to the establishment of the People's Palace in London; 'All in a Garden Fair' (1883); 'Dorothy Foster' (1884); 'The World Went Very Well Then' (1887); 'The Ivory Gate' (1892); 'The Rebel Queen' (1893); 'Beyond the Dreams of Avarice' (1895); 'The Orange Girl' (1899); 'The Alabaster Box' (1900); 'The Story of King Alfred' (1901), etc. Among his other works are 'The Eulogy of Richard Jeffries' (1888). He labored for many years to promote the interests of all members of the literary profession, more especially in his capacity as editor of the monthly paper, 'The Author.' On 24 May 1895, he was knighted.

Be'show, the Alaskan pollack. See POLLACK.

Beside the Bonnie Brier Bush, a novel by Ian Maclaren (the Rev. Dr. John Watson), delineating Scottish character and life among the lowly. It consists of short sketches with no attempt at plot, but interest attaches to the well-drawn characters. It is one of the best examples of what has been styled the "kail-yard" school of fiction, whose principal exponents are Crockett, Barrie, and Watson.

Bes'ika Bay, an inlet of the Ægean Sea on the northwest coast of Asia Minor, opposite Tenedos, to the south of the entrance of the Dardanelles. The English fleet was stationed here during crises in the Eastern question in 1853-4 and 1877-8.

Beskow, bēs'kōv, **Bernhard**, Swedish dramatist: b. Stockholm, 19 April 1796; d. 17 Oct. 1868. He was ennobled in 1826 and appointed marshal of the royal household in 1833. He officiated for some time as director of the royal theatre, and is the author of several excellent tragedies, which were translated into Danish and German by Oehlenschläger, and of which 'Torkel Knutsson' is considered the best acting play on the Swedish stage. He wrote an opera, 'Trubaduren,' for which Oscar, the present king of Sweden, composed the music. His literary reputation was increased by his books of travel, by his poetical works, and by his contributions to the press. The great prize of the academy was awarded in 1824 to his poem 'Sveriges anor.'

Bessara'bia, a province in European Turkey since the Peace of Bucharest, in 1812, between Turkey and Russia. It extends in a northwesterly direction from the Black Sea, between the Pruth and the Dniester; area, 17,619 square miles. A portion of it at the southeast extremity was ceded to Turkey in 1856, but was restored in 1878. Agriculture is chiefly developed in the north, pasturage is most largely carried on the south, in the middle portion are extensive forests. It is watered by the Dniester, the Pruth, and the Danube. The inhabitants include Russians, Poles, Rumanians, Bulgarians, Germans, Armenians, Jews, etc. The capital is Kishenev. The products are salt, wool, tallow, leather, soap, etc. Pop. 1,782,900.

Bessa'ron, **Johannes**, or **Basilus**, Greek monk: b. Trebizond, 1389; d. Ravenna, 19 Nov. 1472. He was titular patriarch of Constantinople.

BESSEL — BESSEMER

ple, archbishop of Nicæa, afterward cardinal and legate to France, in the time of Louis XI. After having spent 21 years in a monastery of Greece, devoted to theology and literature, he left it to follow the Emperor John Palæologus to Italy, with the intention of being present at the Council of Ferrara, in the hope of uniting the Greek and Latin churches. They were accompanied by many Greeks, distinguished by their talents and dignity. Bessarion seconded with so much zeal the projects of Palæologus that he became odious to the Greek Church, while Pope Eugenius IV. rewarded him for his devotion to that of Rome, by the dignity of cardinal-priest. He was sent to France by Sixtus IV., to reconcile Louis XI. with the Duke of Burgundy, and obtain aid against the Turks. He did not succeed, and it is pretended that he received a personal insult from the king, which humiliation some suppose to have been the cause of his death.

Bessel, Friedrich Wilhelm, German astronomer: b. Minden, Prussia, 22 July 1784; d. 17 March 1846. An astronomical tract which he had drawn up brought him into communication with Olbers, who encouraged him in his labors, and procured for him the appointment of inspector of astronomical instruments to the University of Göttingen. In 1810 he removed to Königsberg, and in 1812-13 superintended the construction of the observatory of this town. From 1824 to 1833 he completed a series of 75,011 observations on the celestial zone contained between 15° N. and 15° S. declination. These observations included all the stars in the zone as far as the ninth degree. A dissertation which he published in 1844 contains important investigations on the variability of the movements of the fixed stars. An important share in the discovery of the new planet Neptune belongs to him, as in a paper read in 1840 he called attention to the existence of a planetary mass beyond Uranus, founding on considerations which were afterward happily proved to be correct. His principal works are an 'Essay on the Path Traversed by the Comet of 1807'; 'Astronomical Observations' during various years; 'Determination of the Length of the Pendulum Which Beats Seconds at Berlin'; 'Investigations and Measurements made with a View to Establish a Metrical Unit for Prussia'; 'Measure of the Distance of the Sixty-first Star of the Constellation of the Swan'; and 'Popular Lectures on Scientific Questions.' These last, consisting of papers which Bessel had read before the Physico-economical Society of Königsberg from 1832-44, were published in 1848.

Bessels, Emil, German naturalist: b. Heidelberg, 2 June 1847; d. Stuttgart, 30 March 1888. He was educated in the University of Heidelberg, and while an assistant at the Royal Museum in Stuttgart became interested in the subject of Arctic research. In 1869 he was a member of Petermann's expedition that sailed into the sea between Spitzbergen and Nova Zembla. In 1871 he came to the United States and was appointed both naturalist and surgeon to the expedition under Capt. Charles F. Hall, United States navy. Most of the scientific results of this expedition were gathered by his personal efforts, and published under the title of 'Report on the Scientific Results of the

Polaris Expedition' (1876). In 1879 he published a German narrative of the expedition, illustrated with his own sketches. Later he returned to Germany, where he devoted himself to literary pursuits, art and geographical instruction.

Bessemer, Sir Henry, English inventor of distinction: b. Charlton, Hertfordshire, 19 Jan. 1813; d. London, 15 March, 1898. He received mechanical training at an early age in the type-foundry of his father, a French artist, and going to London at 18 began his career as a modeler and designer. His earliest invention was an improved method of stamping deeds which the revenue office straightway adopted without giving him any compensation therefor. Late in life he brought the matter to the attention of the government and was then knighted (1879) in acknowledgment of his services in this particular. His inventive ability was next turned to the production of a new method of making bronze-powder or "gold" paint, as it was called, which proved a commercial success, and subsequent inventions of his were machines for making Utrecht velvet and improvements in type-casting machinery. At the time of the war in the Crimea he designed a projectile intended to revolve in its flight, but as the cannon of that day were not strong enough to permit of its use, he went on experimenting in Paris under the patronage of Louis Napoleon till he had secured a much improved kind of cast iron. This, however, did not fully satisfy him and he continued at work refining the iron until steel was produced. He took out patents for this invention in 1855, but persevered in experiments till at his London bronze factory steel ingots had been manufactured which could be rolled into rails without hammering. When this process had become fully developed the Bessemer Steel Works were built in Sheffield, where, besides employing a large number of workmen in steel manufacture, many others were trained for similar work in factories all over the world. On 13 Aug. 1856, he read before the British Association at Cheltenham a paper dealing with the invention which has made his name famous, "The Manufacture of Malleable Iron and Steel without Fuel." This was a new and cheap process of rapidly making steel from pig-iron by blowing a blast of air through it when in a state of fusion, so as to clear it of all carbon, and then adding just the requisite quantity of carbon to produce steel—a process which has introduced a revolution in the steel-making trade, cheap steel being now made in vast quantities and used for many purposes in which its price formerly prohibited its application. At the Birmingham meeting in 1865 he read a second paper "On the Manufacture of Cast Steel, Its Progress and Employment as a Substitute for Wrought Iron." The Bessemer process has not only stimulated the growth of the steel industry but greatly reduced the cost of manufacture and rendered steel available for rails and general engineering work. Since 1858, when the Sheffield works, the principal ones in England, produced less than 50,000 tons the amount manufactured has increased until in 1896 Great Britain produced 1,815,842 tons of Bessemer steel and the United States 3,019,906. In the past 50 years the Bessemer process has seen but few improvements of any importance.

BESSEMER—BESTIARIES

Beside his great invention, that of the Bessemer process, with others previously named, Bessemer was also the originator of a method still in use for compressing into a solid block the graphite employed in the manufacture of lead pencils; of a system of rollers for embossing and printing paper; of improvements in telephones; and of a ship with a stationary cabin, the latter the only failure of note in the long series of his inventions. In 1859 he received the Telford Medal of the Institute of Civil Engineers; and in 1872 the Albert Medal of the Society of Arts. He was president of the Iron and Steel Institute of Great Britain, 1871-3, and in 1879 became a Fellow of the Royal Society. Engineers have sometimes felt that Bessemer did not receive from his own government the honors that his distinguished services to British industrial development merited and that he was in effect more highly esteemed in the United States where eight localities and one railway bear his name. Bessemer was an honorary member of many foreign scientific and engineering societies, among which was the American Society of Mechanical Engineers. Before the latter, in December 1896, he presented a paper entitled "The Origin of the Bessemer Process," printed in its 'Transactions' (Vol. XVII. 1890). See STEEL MANUFACTURE.

Bessemer, Ala., a city in Jefferson County, on several trunk railroads; 12 miles southwest of Birmingham, the county-seat. It was founded in 1887 as a manufacturing place because of the valuable iron and coal mines in its immediate vicinity. It contains iron foundries, coke ovens, a number of blast furnaces, machine shops, planing mills, iron pipe works, fire brick works, and other works connected with the iron and steel industry. It has four banks, several weekly newspapers, electric lights, waterworks, and a property valuation of \$3,000,000. It is governed by a mayor elected biennially and a city council. Pop. (1900) 6,358 within incorporated limits.

Bessemer, Mich., city and county-seat of Gogebic County, on the Chicago & N. W. and several other railroads; 40 miles east of Ashland, Wis. It is in an important iron mining and lumbering region; was founded in 1884, and has become important by reason of its mining and manufacturing and its trade relations with the surrounding territory. It has a good school system and a notably fine high school building, city-hall, stone court-house, a national bank, churches of all denominations, and weekly newspapers. Pop. (1900) 3,911.

Bessemer Steel Process. See BESSEMER, SIR HENRY; STEEL MANUFACTURE.

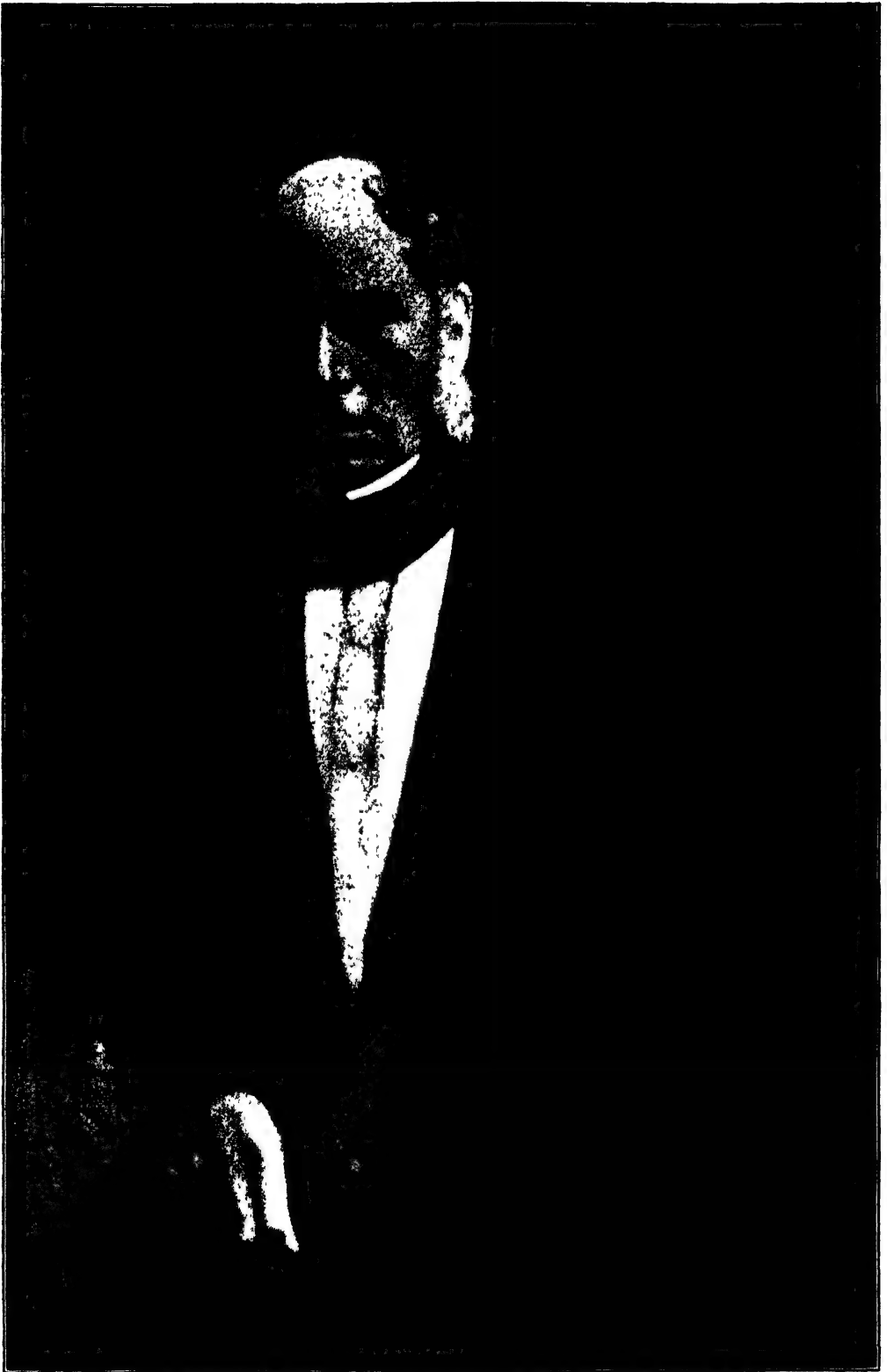
Bessey, Charles Edwin, American botanist; b. Wilton, Ohio, 21 May 1845. He was professor of botany in the Iowa Agricultural College in 1870-84; and has been professor of botany in the University of Nebraska since 1884. He was also president of the Society for the Promotion of Agricultural Science in 1883-5; president of the Nebraska Academy of Sciences in 1891; acting chancellor of the University of Nebraska in 1888-91; Fellow of the American Association for the Advancement of Science. His publications include: 'Reports on Insects' (1873-4); 'Geography of Iowa' (1876); 'The Erysiphei of North America' (1877); 'Botany

for High Schools and Colleges' (1880); 'Essentials of Botany' (1884); 'Reports of the State Botanist of Nebraska' (1887 to 1892), etc. He was editor in charge of the department of botany of 'Johnson's Universal Cyclopædia,' in 1892-5; and is one of the editors of 'Science.'

Bessi  res, b  s-y  r, Jean Baptiste (DUKE OF ISTRIA), French marshal: b. Preissac, 6 Aug. 1768; d. Lutzen, 1 May 1813. Entering the army in 1792 as a private soldier, in less than two years he had attained the rank of captain. After making the Spanish campaign, he passed into the army of Italy, and soon attracted the notice of Napoleon, who took him to Egypt in 1798, where his conduct at St. Jean d'Acre and Aboukir covered him with glory. At the accession of Napoleon to the throne, he became marshal of France. He showed his usual conspicuous courage at Austerlitz, Jena, Eylau, and Friedland, and, raised to the rank of Duke of Istria, commanded in Spain in 1808-9. In the Russian campaign he led the cavalry of the Guard, and did much by his sleepless courage and presence of mind to save the wreck of the army in the disastrous retreat from Moscow. On the morning of the battle of Lutzen he fell mortally wounded by a cannon ball.

Best, William Thomas, English musician: b. Carlisle, 13 Aug. 1826; d. Liverpool, 10 May 1897. In 1848 he was appointed organist of the Philharmonic Society in Liverpool; in 1852 he went to London and became organist of the Panopticon of Science and Art, and also of the Church of St. Martin-in-the-Fields; in 1854 was organist of Lincoln's Inn Chapel; in 1855 returned to Liverpool, and became organist of St. George's Hall; in 1868 was organist of the Liverpool Musical Society; and in 1872 was again engaged by the Philharmonic Society. He was the author of 'The Modern School for the Organ' (1853); 'The Art of Organ Playing' (1870); 'Arrangements from the Scores of the Great Masters' (1873); 'The Organ Student'; 'Organ Concertos'; 'Opera and Oratorio Songs,' etc.

Bestiaries, the name given to certain extremely popular books of the Middle Ages. In the written volumes, sometimes with copious illustrations, were given descriptions of animals, real and imaginary, which was which being left to the discretion or knowledge of the readers. They were composed in verse or prose or a mixture of both, and were designed not only as hand-books of zoology, but as teachers of morals as well. It was the fashion to attach spiritual meanings to the animals or their actions, until every quality of good or evil in the soul of man had its type in the beast world. It is to the bestiaries that we must look for explanation of the strange, grotesque creatures which are found sculptured on the churches and other buildings of the Middle Ages. The oldest Latin bestiaries had an early Greek original, the well-known 'Physiologus,' under which name about 50 such allegories were grouped. The Greek text of this famous work is found only in manuscript. There are old Syriac, Armenian, Ethiopic, Arabic, Icelandic, and numerous Latin versions. Editions of the Latin have been issued—Mai, Heider, and Cahier. An Old High German version was made earlier than the 11th century; in the 12th century, ver-



SIR HENRY BESSEMER.

sions in French were made by Philippe de Thaun and Guillaume, a priest of Normandy. The 'Bestiary of Love' of Richard de Fournival was rather a parody upon the earlier form of such books. The following is a characteristic extract from the 'Divine Bestiary': "The unicorn has but one horn in the middle of its forehead. It is the only animal that ventures to attack the elephant; and so sharp is the nail of its foot, that with one blow it rips up the belly of that most terrible of all beasts. The hunters can catch the unicorn only by placing a young virgin in the forest which it haunts. No sooner does this marvelous animal descry the damsel than it runs toward her, lies down at her feet, and so suffers itself to be taken by the hunters. The unicorn represents our Lord Jesus Christ, who, taking our humanity upon him in the Virgin's womb, was betrayed by the wicked Jews, and delivered into the hands of Pilate. Its one horn signifies the Gospel truth, that Christ is one with the Father," etc.

Bestuzheff, bē-stoo'zhēf, Alexander Alexandrovitch, Russian novelist and soldier: b. St Petersburg, 3 Nov. 1797; d. 19 July 1837. Of his numerous novels, the most celebrated are 'Ammalat-Beg'; 'The Nadeshda Frigate'; 'The Terrible Prophecy'. His 'Private Correspondence' is highly prized. He was killed in battle in the Caucasus.

Bestuzheff-Ryumin, bē-stoo'zhēf ryoo'men, Count (MICHEL ALEXEI PETROVITCH), Russian statesman: b. Moscow, 1693, of a family of English origin, and of the second class of nobles in Russia; d. St Petersburg, 24 April 1766. He entered the civil service under Peter the Great, and became a diplomatist. Under the Empress Anne he was made a member of the cabinet, and the Empress Elizabeth, whose fullest confidence he possessed, created him count, great chancellor of the empire, and his influence in the government was almost boundless. He was strongly opposed to the Prussian and French diplomatic influence, and was disliked on this account by Peter III, nephew and presumptive heir of Elizabeth. He concluded several treaties with England, Sweden, and Denmark, favorable to English policy. By a treaty concluded in 1747, he paved the way for the union of Schleswig and Holstein with the kingdom of Denmark. By his influence, the Russian troops supported Austria against Frederic the Great in the Seven Years' war. But their commander, Apraxin, retired to Russia, and this occasioned the fall of Bestuzheff. He was imprisoned and degraded, but Catharine II, in 1762, restored him to liberty and to his previous social position. He is regarded as the inventor of a chemical preparation known in medicine under the name of *tinctura tonica Bestucheffi*.

Be'tain, or Be'taine, an organic base, having the chemical composition $C_8H_{11}NO_2$, obtained from the juice of the common beet, or from beet-root molasses. It is not present in the beet-root in nature, but is obtained from it by the action of baryta or hydrochloric acid. The hydrochloride is one of its most important salts, and numerous others are also known.

Betanzos, bā-tān'thōs, Juan Jose de, Spanish adventurer of the 16th century. He settled at Cuzco, Peru, where he married a daughter of the inca and at the command of Mendoza,

the viceroy, wrote an account of the conquest of Peru by Pizarro. It remained in manuscript till 1880, when it was published with the title, 'Suma y Narracion de los Incas.'

Be'tel, Betle, Pawn, or Pinang, popular Oriental names for various species of Piper, especially *P. betle*, and *P. siriboa*, climbing shrubs cultivated in the East for their leathery leaves which are used to a prodigious extent with bits of areca-nut and shell lime for chewing, particularly by the Malay races. The plants are trained upon trellises, poles, etc., in shady but hot and moist places, which in northern India are secured by means of sheds. Europeans do not take readily to the habit because the mixture is hot, acrid, astringent, abridges the mouth, temporarily destroys the sense of taste, reddens the lips as if they were covered with blood and blackens the teeth, which are sooner or later destroyed. At 25 years of age, habits are often toothless. Among East Indian races the habit dates back more than 2,400 years and at the present time is as general as was the habit of using snuff among Europeans; the betel box is carried by old and young, men and women, and presented upon all occasions. Opinions differ as to the utility or perniciousness of this habit, some writers claiming advantages which in the face of the above-mentioned facts seem as far-fetched as like arguments in defense of the similar use of tobacco.

Betelgeuse, bēt-ēl-gerz', the star Alpha Orionis, the bright, reddish star in one of the shoulders of Orion. It varies somewhat in brightness, but in no regular period.

Beth Peor, bēth pē'or (Hebrew, house of Peor), a city where the Israelites are said to have received the laws of Deuteronomy, and the supposed locality of Moses' burial. The precise locality of Beth Peor is undetermined, however, and various points have been suggested as probable sites, but the only theory which seems reasonably sure is that it stood somewhere among the Nebo-Visgah Mountains.

Beth'am-Edwards, Matilda, English author. b. Suffolk, 1836. She was privately educated, and has published numerous works in poetry, fiction, and on French rural life. She was made an officer of public instruction in France in 1891. Among her works are 'The White House by the Sea'; 'Kitty'; 'The Dream Charlotte'; 'France of To-day'; 'A Romance of Dijon'; 'The Lord of the Harvest,' a volume of poems, and an edition of Arthur Young's 'Travels in France.'

Beth'any, a village of Palestine, at the foot of Mount Olivet, on the eastern side, about two miles east of Jerusalem, where Lazarus dwelt and was raised from the dead, and where the ascension of Christ is related to have taken place. The house and grave of Lazarus, and the house of Mary Magdalene, are still shown to travelers.

Bethany College, a co-educational institution in Linsborg, Kan; organized in 1881 under the auspices of the Lutheran Church; reported at the end of 1899: Professors and instructors, 30; students, 600; volumes in the library, 4,500; grounds and buildings valued at \$120,000; income, 22,000; number of graduates, 300; president, Rev. C. Swenson, Ph.D.

BETHANY COLLEGE — BETHLEN-GABOR

Bethany College, a co-educational institution in Bethany, W. Va.; organized in 1841 under the auspices of the Church of the Disciples; reported at the end of 1898: Professors and instructors, 10; students, 100; volumes in the library, 3,000; grounds and buildings valued at \$200,000; income, \$1,900; president, C. A. Young, Ph.D.

Beth'el, a town of Palestine, about 10 miles from Jerusalem, now called Beitin, or Beiteen. The patriarch Jacob here had a vision of angels, in commemoration of which he built an altar. Interesting ruins abound in the vicinity.

Bethel College, an educational institution in Russellville, Ky.; organized in 1854 under the auspices of the Baptist Church; reported at the end of 1899: Professors and instructors, 6; students, 104; volumes in the library, 5,000; grounds and buildings valued at \$62,500; productive funds, \$85,000; income, \$16,500; number of graduates, 236; president, E. A. Alderman, D.D.

Bethencourt, Jean de, bā-tōn-koor, zhōn dē, king of the Canary Islands: d. 1425. He was chamberlain to Charles VI. of France, but being ruined in the war with England, he sought to repair his fortunes in foreign countries, and made a descent from Spain on the Canary Islands in 1402. Not having sufficient force, however, he returned, and obtained reinforcements from Henry III. of Castile, with which he was successful, and was crowned king in 1404, under the title of Louis. He converted the greater portion of the Canaries to Christianity, and in 1405 received from the Pope the appointment of bishop to the islands. The following year he went to Normandy, where he passed the remainder of his days.

Bethesda, bē-thēz'da, a pool in Jerusalem, the name of which signifies "house of mercy." In the five halls or porticos near it many patients lay waiting, according to the account of John (ch.v.), for the moving of the waters, to bathe in. According to the belief of the Jews, an angel descended, at a certain time, into the pool and troubled the water, and whoever first entered the water after this agitation was cured. In 1888 a rock-hewn basin or reservoir was discovered, with five chambers adjoining, which is supposed to be identical with the pool of Bethesda.

Bethlehem, bēth-lē-ēm, or -hēm, Palestine; a village five miles from Jerusalem, at the foot of a hill covered with vines and olive-trees; the birthplace of Jesus Christ. An aqueduct conveys water from the hill to the village. Its inhabitants are chiefly Christians, and make rosaries, crucifixes, etc., for pilgrims. There are three convents here, for Roman Catholics, Greeks, and Armenians, surrounding a stately church said to have been erected by the Empress Helena in 327, over the place where Christ was born. It is built in the form of a cross, and separate portions of it are allotted to the Latins, Greeks, and Armenians, respectively. On either side of the nave are two rows of beautiful columns, marking off two corresponding aisles. The top commands a fine view over the surrounding country. In a rich grotto, furnished with silver, and crystal lamps, under the choir of this church, a trough of marble is shown, and is said to be the manger in which Jesus was

laid after his birth. Several other spots of interest mentioned in the Bible are shown here. Pop. 7,000.

Bethlehem, Pa., a borough in Northampton County; on the Lehigh River and canal, and the Lehigh V., the New Jersey C., and other R.R.'s; 57 miles north of Philadelphia. It was founded in 1741 by Moravians under Count Zinzendorf, and is the chief centre of that sect in the United States. It contains a Moravian theological seminary, a Moravian seminary for young ladies, more than a dozen churches, and two national banks. On the opposite side of the river, here spanned by two bridges, is South Bethlehem, the seat of Lehigh University (q.v.), the main offices of the Lehigh Valley Railroad Company, and a number of important manufacturing establishments, including silk mills, rolling mills, foundries and machine shops, brass works, zinc oxid and spelter works, etc. Monocacy Creek separates Bethlehem from West Bethlehem, which is also an industrial borough. Bethlehem is attaining a conspicuous position in the musical world from the institution of an annual festival which has developed from the great love of the Moravians (q.v.) for music in their religious services, and especially for the compositions of John Sebastian Bach. The first organized festival was held in 1901, and the movement attracted so much attention that it has been resolved to continue the series. Originating in the church, the festival is in charge of its musical director, who has organized an orchestra of some 60 pieces, a choir of over 100 voices, and a boy chorus of about the same strength. The musical and other ceremonies of the Moravian church at Easter are treated under the title MORAVIAN CHURCH. Pop. (1900) Bethlehem, 7,293; South Bethlehem, 13,241.

Bethlehemites, an order of monks somewhat like the Dominicans, who settled in England in 1257. They were so named because they wore on the breast a five-pointed star in commemoration of the star that appeared at the birth of Jesus. The order was comparatively insignificant and had only one convent in England (at Cambridge). An order of American Bethlehemites, sanctioned by Innocent XI. in 1687, was established in the city of Guatemala by a Franciscan monk named Bethencourt, a native of the island of Teneriffe, about 1655. A female order of Bethlehemites also was founded by Maria Anna del Galdo, who belonged to the Tertiaries of St. Francis. Twenty years later the privileges of the order were enlarged to an equality with those of the Augustinians, Dominicans, and Franciscans. The followers of Huss are sometimes called Bethlehemites, from the church in Prague in which Huss preached.

Bethlen-Gabor, bēth-lēm gā'bōr, or **Gabriel Bethlen**, Prince of Transylvania: b. 1580; d. 1629. He was of humble origin, but at the age of 17 he entered the service of Gabriel Bathori, prince of Transylvania, fought under his orders, and then repaired to Constantinople, where his courage gained him the esteem of the Turks. Prompted by ambition, he became ungrateful to his first benefactor; and after bringing Bathori into bad odor with both the Transylvanians and the Turks, managed to make the latter declare war, and actually headed a Turkish army against him. His treachery was suc-

BETHNAL GREEN—BETROTHED

cessful and in 1613 he was proclaimed prince of Transylvania. Shortly after, having succeeded in stirring up the Hungarians against the Emperor Frederick II., he took several towns, and in 1618 assumed the title of king of Hungary. Thereafter, supported by Turks and Tartars, he entered Austrian territory, laid waste Moravia, hemmed in the imperial army, and was on the eve of gaining a complete victory when the refusal of the Turks to undergo a winter campaign defeated all his hopes. The approach of Tilly compelled him to withdraw, and he was glad to conclude a peace which deprived him of his Hungarian title, but left him in possession of his conquests. While preparing for a new war against the imperialists he died of dropsy. He is said to have participated in 42 battles.

Beth'nal Green, England, an eastern suburban district and parish of London, in Middlesex County, now forming a parliamentary borough, having two divisions with two members. In 1872 a branch of the South Kensington Museum was opened in the district. Pop (1891) 129,134.

Bethphage, bēth'fāj (Hebrew, house of figs), a place of Scriptural interest, of which no trace is left. Its name was significant of its general location, but not of the particular site. "The place of figs," it must have been situated somewhere on the eastern slope of that range of hills extending north and south between Jerusalem and Bethany, at the foot of which in the western valley flowed the Kedron. The principal points of this range are the Mount of Offence and the Mount of Olives. The fig-tree still abounds both on the eastern and western slopes of the range, and even beyond Bethany toward Jericho. Some travelers have been disposed to place Bethphage on the site of the modern village of Abu Dis, lying south, and a little to the east of Bethany. Robinson thought this could not have been its position, and gave little credit to the tradition of the monks of the country, who place it between Bethany and the summit of the Mount of Olives, since there is no trace that a village of any description ever existed there. Lightfoot thought it was a district extending from the Mount of Olives to Jerusalem, and embracing a village of the same name.

Bethsaida, bēth-sā'ī-da, a village on the west shore of the Lake of Galilee, the birthplace of Peter and Andrew and Philip. Its site has been identified with a heap of grass-grown ruins. At the northeast extremity of the lake was another Bethsaida, a village, near which the 5,000 were fed. Philip the Tetrarch raised it to the dignity of a town, and renamed it Julias, in honor of the Emperor Augustus' daughter.

Bethshemesh, bēth-shē'mēsh (Hebrew, house of the sun), a city of ancient Palestine, which probably occupied the site of the modern village, Ain Shems, about 15 miles west-southwest of Jerusalem, where extensive ruins are still remaining. The exploits of Samson were mainly in the neighborhood of Bethshemesh.

Bethune, bē-thoon', **Charles James Stewart**, Canadian educator: b. West Flamboro, Ont., 11 Aug. 1838. He was graduated at Trinity College, Toronto, in 1859; ordained deacon in the Church of England in 1861, and priest in 1862. He became incumbent of the Credit Mis-

sion in 1866, and in 1870 was appointed to the head mastership of Trinity College School, in Port Hope. He is well known as a writer on scientific subjects. He was the first editor of 'The Canadian Entomologist,' a monthly magazine. Resigning this place, he edited for a considerable time the entomological department of the *Canadian Farmer* and the *Weekly Globe*. In 1886 he again became editor of the 'Canadian Entomologist.' In 1892 he was elected a Fellow of the Royal Society of Canada.

Bethune, George Washington, American Dutch Reformed clergyman and poet: b. New York, 18 March 1805; d. Florence, Italy, 27 April 1862; was noted as an orator and a wit. He had charges at Rhinebeck, and Utica, N. Y., Philadelphia, Brooklyn, and New York city. Besides religious works, he wrote 'British Female Poets,' 'Lays of Love and Faith' (1847); several of the hymns in which are widely used. He also published an edition of Izaak Walton's 'Complete Angler' (1846); etc. See Life, by Van Nest (1867).

Bethune, bā-tun, France, a town in the department of Pas de Calais, 19 miles north-northwest of Arras. It stands on a rock washed by the Brette, and is a place of considerable strength. The appearance of the town is not prepossessing. There is, however, one fine square, the centre of which is occupied by an ancient belfry of remarkable construction, while the hotel-de-ville, among the best edifices in the town, forms one of its sides. The chief manufactures are oil, soap, and cloth. There are also distilleries, tanneries, and salt and sugar refineries. The trade is greatly favored by the canals of Lawe and Bassée, which meet here. The family of the lords of Bethune is very celebrated, and a branch of it was established in Scotland about the end of the 12th century. To this branch the celebrated Cardinal Beaton belonged. Pop. (1896) 11,627.

Betlis, or **Bitlis**, a town of Turkish Armenia, about 20 miles west from Lake Van. It is one of the most ancient cities of Kurdistan, situated in a wide ravine, traversed by a stream, on whose steep banks the town is built. The houses are of red stone, generally two stories in height, with grated windows to the streets. In the centre, on a high rock, is an ancient castle, formerly the residence of the khans of Betlis. The country around is fertile, well cultivated, and produces excellent crops of grain, cotton, hemp, rice, olives, tobacco of the best description, and excellent fruits and vegetables. The principal manufactures of the town are coarse cotton cloth and tobacco. Pop about 30,000.

Betrothed, **The**. (1) A famous romance by Alessandro Manzoni—'I Promessi Sposi.' It was its author's only romance, but it sufficed to place him at the head of the romantic school of literature in Europe. The scene of the story is laid within the country around Milan, and the plot concerns only the troubled and impeded but at last happily liberated course of true love between the humble peasant Renzo and his already betrothed Lucia. The religious motive of the book is sincere but not exaggerated, and never runs to fanaticism. Its original publication was in three volumes, and occupied two years, 1825-6, during which time it awakened a wide interest in European circles; and having been soon translated into all modern languages, it has become

BETROTHMENT—BETTERTON

probably the best known of all Italian romances to foreign readers. (2) A novel by Sir Walter Scott (1825), the scene of which is laid in the reign of Henry II. (3) An opera by Pelrella, first sung in 1869, at Lecco.

Betrothment, or Betrothal, a mutual promise or compact between two parties, by which they bind themselves to marry. The word imports giving one's troth, that is, true faith or promise. Formal ceremonies of betrothment are not the custom in the United States and Great Britain, as on the Continent, where the betrothment is either solemn (made in the face of the church), or private (made before witnesses out of the church). As betrothments are contracts, they are subject to the same rules as other contracts; for instance, that they are valid only between persons whose capacity is recognized by law; and the use of fraud, violence, or intimidation vitiates the contract. The consent of both parties, of course, is required. This may be expressed either verbally, or by writing, or by action. In Germany, the consent of the parents is always necessary, if the parties are under age, not yet *sui juris*. But if the parents withhold their consent unreasonably, the permission of the judge is allowed to sanction the contract. If the opinions of the parents are diverse, the law gives effect to that of the father. Betrothments contracted thus, according to law, are called *sponsalia publica*; others are called *sponsalia clandestina*. The latter are, in some places, utterly invalid; in others, only punishable. By the common German law, however, they are valid in every case in which consummation or consecration by the priest has taken place. The parents, in these cases, are not allowed to apply for a dissolution of the contract, nor can they refuse their consent, except for highly important reasons. Public betrothment induces the obligation to marry. In case of refusal to complete the contract by marriage, the injured party is allowed an action at law to compel its performance; but, since unhappy marriages are among the greatest misfortunes, the means of compulsion applied by the law are never great, amounting only to a small fine, or a short imprisonment. If circumstances take place which, if happening before the betrothment, would have necessarily prevented it, the party affected by them is allowed to recede from the engagement, and modern laws allow only an action for damages. In Germany, betrothment generally takes place in a small company of relations and friends. In Russia, it was once binding and indissoluble, like marriage, but is now a mere form accompanying the marriage ceremony. The contract is called by the Jews *theneim rischonim*. In the laws of Moses there are certain provisions respecting the state of the virgin who is betrothed. Selden's 'Uxor Hebraica' gives the schedule of Hebrew contracts of betrothment. With the Jews, a young woman is rarely allowed to enter into an engagement without the cognizance of her relatives, who, in fact, in most cases, arrange matters for her, and generally avail themselves of the services of marriage brokers, who receive a percentage upon the amount of the dowry, beside a gratuity. In the continental cities these Jew marriage brokers have matches always on hand, with dowries varying from \$5,000 to \$200,000, and as soon as the betrothment has taken place they look upon the bargain as concluded; but cases frequently

occur, in which on the day of the wedding the bridegroom breaks the match because the Austrian metalliques or Spanish Ardoins, tendered in payment for the dowry, have fallen in value, and reduced the dowry perhaps to the extent of 20 or 25 per cent. Among the ancient Greeks, the father made a selection for his daughter. The young couple kissed each other for the first time in the presence of their friends, and it was customary for the bridegroom to bring flowers daily, until the wedding day, to the house of his bride. The Arab sends a relative to negotiate about his intended bride, and the price at which she is to be had. The bridegroom of Kamchatka has to serve in the house of his prospective father-in-law before an engagement is allowed to take place. With the Letts and Esthonians no engagement is considered valid until the parent and relatives of the bride have tasted of the brandy which the bridegroom presents. Among the Hottentots, the would-be bridegroom is not allowed to propose without being accompanied by his father. Father and son walk arm in arm, with pipes in their mouths, to the house of the bride, where the engagement takes place. Among some of the indigenous tribes of America it was customary to keep the betrothed lady in durance for 40 days, as the superstition prevailed that she would exert an occult influence upon any thing she touched or anybody with whom she came into contact. During these 40 days the lady was kept on starvation fare, so that when the day of the wedding came she looked more like a skeleton than like a bride. See Pollock and Maitland, 'History of English Law' (2d ed. 1899).

Betsy and I Are Out, the title of a popular American poem by Will Carleton (q.v.), first printed in the Toledo *Blade* in 1872.

Betteloni, bêt-te-lô'ne, **Vittorio**, Italian poet: b. Verona, 1840. He was educated in Pisa, and became professor of Italian literature and history in the Female College in Verona. His verse proves him an adherent of that Italian classical school which dates from 1869, and includes 'In the Springtime' (1869); 'New Stanzas' (1880); and a translation of Goethe's 'Herman and Dorothea.'

Betterton, Thomas, English actor: b. August 1635; d. London, 28 April 1710. He was the son of an under-cook in the service of Charles I., and was apprenticed to a bookseller in London. His master, Mr. Rhodes, obtained a license for a company of players in 1659, and with him Betterton commenced his career. He was engaged by Davenant in 1662. His position was soon pre-eminent, and he became an established favorite. He seems to have had no personal graces from nature to second his rare talents, if the following account be true: "Mr. Betterton, though a superlatively good actor, labored under an ill figure, being clumsily made, having a great head, a short, thick neck, stooped in the shoulders, and had fat, short arms, which he rarely lifted higher than his stomach. His left hand frequently lodged in his breast between his coat and waistcoat; while with his right he prepared his speech; his actions were few but just; he had little eyes and a broad face, a little pockfretten; a corpulent body, and thick legs, with large feet; he was better to meet than to follow, for his aspect was serious, venerable, and majestic. In his latter time, a little para-

BETTINELLI—BETTY

lytic; his voice was low and grumbling, yet he could tune it by an artful climax which enforced universal attention even from the fops and orange girls. He was incapable of dancing even in a country dance, as was Mr. Barry, but their good qualities were more than equal to their deficiencies." Betterton had the rare faculty of identifying himself with his part. He married Mrs. Sanderson, an actress of almost equal merit with himself, whose Lady Macbeth was reckoned a perfect piece of acting. He was prudent and saving, but he lost his small means in a commercial speculation, and a theatre which he afterward opened was not successful. After his retirement from the stage, he reappeared in his old age a few times to take a benefit, his last appearance being 13 April 1710. He was buried in Westminster Abbey. See Howe, 'Thomas Betterton' (1891).

Bettinelli, bêt-te-něl'le, **Saverio**, Italian author: b. Mantua, 1718; d. 1808. He studied under the Jesuits; entered, in 1736, the novitiate of this order, and taught from 1739 to 1744, belles-lettres at Brescia, where he made himself known by some poems composed for the use of schools. In Bologna, where he studied theology, he continued to cultivate his poetical talents, and wrote for the theatre of the college his tragedy of Jonathan. In 1751 he was intrusted with the direction of the college of nobles at Parma. After the suppression of the Jesuits in 1773 he returned to his native city, where he resumed his literary labors. His chief work is his '*Risorgimento negli Studi, nelle Arti e ne' Costumi dopo il Mille*' (1775). The '*Lettere dieci di Virgilio agli Arcadi*' attracted great attention, and its criticism of the older poets, particularly Dante, involved him in many contests. The best of his poems are his '*Versi Sciolti*,' which though they do not show any great poetical power, are always elegant and ingenious.

Betting, the staking or pledging of money or property upon a contingency or issue. The processes of betting may be best illustrated in connection with horse-racing, which furnishes the members of the betting fraternity with their best markets. Bettors are divided into two classes—the backers of horses, and the book-makers, or professional bettors, who form the betting ring, and make a living by betting against horses according to a methodical plan. By the method adopted by the professional bettor the element of chance is as far as possible removed from his transactions, so that he can calculate, with a reasonable prospect of having his calculations verified, on making more or less profit as the result of a season's engagements. Instead of backing any particular horse, the professional bettor lays the same sum against every horse that takes the field, or a certain number of them, and in doing so has usually to give odds, which are greater or less according to the estimate formed of the chance of success which each of the horses has on which the odds are given. In this way, while in the event of the race being won (as is usually the case) by any of the horses entered in the betting-book of a professional bettor, the latter has always a certain fixed sum (say \$1,000) to pay, he receives from the backers of the losers sums which vary in proportion to the odds given. Thus, if a book-maker is making a

\$1,000 book, and the odds against some horse is four to one, he will, if that horse wins, have to pay \$1,000, while, if it loses, he will receive \$250. It usually depends upon which horse it is that wins a race whether the book-maker gains or loses. If the first favorite wins it is evidently the worst thing that could happen for the book-maker, for as he is bound to receive the sum of the amounts to which all the horses except one have been backed, the largest deduction must be made from his total receipts on account of the first favorite. Very frequently the receipts of the book-maker are augmented by sums paid on account of horses which have been backed and never run at all. Sometimes, although not often, the odds are given upon and not against a particular horse. Books may also be made up on the principle of betting against any particular horse getting a place among the first three. The odds in this case are usually one fourth of the odds given against the same horse winning. Another mode of betting is that called a sweepstake, in which a number of persons join in contributing a certain stake, after which each of those taking part in the sweepstake has a horse assigned to him (usually by lot), which he backs, and the backer of the winning horse gains the whole stakes. If there are more persons taking part in the sweepstake than there are horses running some of them must draw blanks, in which case of course their stakes are at once lost.

At common law, wagers are not *per se*, void, but statutes prohibiting betting have been passed by many of the States. When one who loses a wager gets another to pay the money for him, an action lies for the recovery of the money. Wagers on the event of an election laid before the poll is open, or after it is closed, are illegal. In horse-racing, simple bets upon a race are unlawful both in England and the United States. In the case even of a legal wager, the authority of a stakeholder, like that of an arbitrator, may be rescinded by either party before the event happens. See **WAGER**.

Betts, Craven Langstroth, American poet and story writer: b. New Brunswick, 23 April 1853. Besides translating '*Songs from Béranger*' in the original metres, he has written '*The Perfume Holder, a Persian Love Poem*'; with A. W. H. Eaton, '*Tales of a Garrison Town*'; and '*A Garland of Sonnets*.'

Betts, Samuel Rossiter, American jurist: b. Richmond, Mass., 8 June 1787; d. New Haven, Conn., 2 Nov. 1868. He practised law in Sullivan County, N. Y.; served in the War of 1812 and first became prominent when appointed judge advocate. He was a member of Congress 1815-17; circuit court judge, 1823-6; and United States district judge, 1827-67. As codifier of the maritime laws of the United States he exercised a clarifying influence upon such questions as salvage, wages, charters, insurance, seamen's wages, etc., and the formulation of the neutrality and patent laws. He published '*Admiralty Practice*' (1838).

Betty, William Henry West, English actor, better known as the **YOUNG ROSCIUS**: b. Shrewsbury, 1791; d. London, 24 Aug. 1874. His first appearance was in Belfast, at the age of 11, when he assumed the role of Osman in '*Zara*,' and achieved an immediate success. For almost five years after this he played the most

BETULA — BEVERAGES

important parts before crowded and enthusiastic audiences, Pitt adjourning the House of Commons in 1805 on one occasion in order to permit members to witness the boy's Hamlet. He quitted the stage in 1808, but after studying for a while at Cambridge, returned to it in 1812, but failed to repeat his early triumphs. He retired finally in 1824, and lived for 50 years in the enjoyment of the fortune he had so early amassed.

Bet'ula, the generic name of birch (q.v.).

Bet'wa, a river in Hindustan, which takes its rise in the Vindhyan Mountains, near Bhopal, and flowing nearly 340 miles in a north-easterly direction through the provinces of Malwa and Allahabad, finally joins the Jumna below Kalpee. Near Erech a slight fall occurs. The country through which it flows is highly cultivated. The river at times is said to rise to a great height and in a portion of its course flows through beds of iron ore.

Beulah, bū'la, a region described in Bunyan's 'Pilgrim's Progress,' where there is nothing to annoy and all sounds are agreeable.

Beurnonville, ber-nōn-vēl, **Marquis de** (PIERRE DE RUEL, pē-ār de ru-ēl), marshal of France: b. Champignolle, Burgundy, 10 May 1752; d. 23 April 1821. Originally intended for the Church, he chose the profession of arms and served in the East until 1789, when he was sent home by the governor of the Isle of Bourbon, his temper being quarrelsome. Arriving in Paris at the commencement of the Revolution, he identified himself at once with it, and in 1792 was appointed aide-de-camp to Marshal Luckner, and was soon after named general-in-chief of the army of the Moselle; in 1793 he became minister of war. Sent in 1793 to arrest Dumouriez, he was himself arrested by Dumouriez, and confined at Ehrenbreitstein, Eger, and Olmutz, until 1795, when he was exchanged, and became successively general-in-chief of the army of the north, inspector-general of infantry, ambassador to Berlin in 1800, to Madrid in 1802, and count of the empire. In 1814 he was commissioned by Napoleon to organize means of defense upon the frontier, and on the emperor's abdication was named minister of state and peer of France by Louis XVIII. On the return of Napoleon to Elba, he was proscribed by a special decree, and retired again, but was reinstated in all his dignities by Louis XVIII. after the battle of Waterloo. He became marshal of France in 1816, and marquis in 1817.

Beust, Friedrich Ferdinand, boist, frē-driñ fer'dē-nand (COUNT VON), Saxon and Austrian statesman: b. Dresden, 1809; d. 1886. He adopted the career of diplomacy, and as member of embassies or ambassador for Saxony resided at Berlin, Paris, Munich, and London. He was successively minister of foreign affairs and of the interior for Saxony. At the London conference regarding the Schleswig-Holstein difficulty he represented the German Bund. He lent his influence on the side of Austria against Prussia before the war of 1866, after which, finding his position in Saxony difficult, he entered the service of Austria as minister of foreign affairs, became president of the ministry, imperial chancellor, and in 1868 was created count. In 1871-8 he was ambassador in London, in 1878-82 in Paris.

Beutenmüller, boi'tēn-mül-ler, **William**, American entomologist: b. Hoboken, N. J., 31 March 1864. Educated in the public schools, he became in 1889 curator of the department of entomology in the American Museum of Natural History. He has written a useful work on butterflies and moths, and contributed to scientific and popular magazines over 100 articles on entomology. He has been president of the New York Entomological Society, and is editor of its 'Journal.'

Beuthen, boi'tēn, Prussia, a town, province of Silesia, government of Oppeln, about two and a half miles from the Polish frontier. It has steam and electric tramways, and among buildings of note are the Roman Catholic Church of St. Mary (13th century), Protestant parish church (15th century), synagogue, royal Catholic gymnasium, higher girls' school, etc. It is an important centre of mining and metallurgy, having iron-works, zinc-works, lead-works, coal-mines, and various industrial establishments. Pop (1895) 42,343.

Bevedero, bā-vā-dā'rō, Argentina, a lake in the province of Mendoza, consisting of two distinct bodies of water, called the Greater and Lesser Bevedero, connected by a river about eight miles long. Greater Bevedero is 40 miles in length from north to south, and from 3 to 25 miles in width. Lesser Bevedero measures about 22 miles by 15. The lake lies between 32° 45' and 34° 17' S. lat. and 66° and 66° 32' W. lon.

Beveland, bā've-lānt, **North and South**, Netherlands, two islands in the province of Zealand, and formed by the mouths of the Scheldt. North Beveland lies east of the island of Walcheren, and is separated from South Beveland by the island of Wolfersdyke. South Beveland, the larger and more fertile, contains Goes, the capital, and several forts and villages. The united area of the islands is 120 square miles.

Beverages. Beverages are those drinks to which mankind resorts in order that he may relieve the pangs of thirst or supply some other demand of the system. In the beginning man's life was marked by its simplicity. Our first parents were content to eat the fruits that they found so convenient for their needs and it is doubtful if they knew any other beverage than the pure water coursing through the streams that irrigated the ground. It was not until they began to eat the flesh of beasts and searched the soil for delicacies to gratify their newly awakened appetite for a variety in foods that they felt the craving of unnatural thirst. But the eating of strong meats required the drinking of stronger drinks than water and in this fact we find the origin of the history of beverages.

It would be intensely interesting if we could know in just what way prehistoric man first satisfied his unnatural thirst for drink. It is, of course, more than probable that the second beverage discovered by man was the milk of the animals he slaughtered to gratify his taste for meat. From a temperate and hygienic point of view it was not a long stride from the waters of the brooks to the milk of cows and asses and yet it stands out as a landmark in the development of the demand for variety, the demand which may be regarded as the first tendency toward civilization. It is also quite probable that,

BEVERAGES

in the beginning, man drank his milk soon after it was drawn or while it was still fresh, but finally there came a day when some prehistoric investigator was bold enough to take a drink of the milk of mares that had been set aside, and from this fermented liquid learned the sensations of intoxication, for kumyss, still the favorite tippie of the Tartar, is unquestionably the most ancient of all intoxicating beverages.

To mankind, next to water, milk is still a favorite beverage, for it possesses the double advantage of being both food and drink. To the civilized taste the milk of cows is the most desirable but more barbaric taste calls for a stronger beverage and is best gratified by the milk of mares, asses, camels, or even rein-deers.

It is undoubtedly true that if we ate only wholesome foods in such quantities only as our system requires; performed our work with regularity; enjoyed, at proper intervals, requisite rest and recreation, and avoided all such deleterious distractions as excitement and worry, water would be the only beverage that nature would demand. Of course, it is unnecessary to state that such an ideal condition could scarcely obtain in these days of modern civilization, and, as the result, it is just as impossible to deny the fact that man sometimes demands a drink that will have a tendency to stimulate or refresh the jaded system.

While it is the primary object of all beverages to relieve thirst nearly all of them also possess other properties that exercise more or less effect upon the body. For example, those drinks which contain the largest quantities of water pass most rapidly into the circulation, increasing the volume of blood. Diluting the food, they not only assist digestion but also aid in eliminating waste matter from the body through the ordinary channels. There are beverages that soothe and beverages that irritate, but all have their purpose. The former find their scope of usefulness in times of fever and cold, while the latter are stimulating irritants of great medicinal value.

Among the most useful beverages are those that best relieve the cravings of thirst, the sour liquids prepared from the lemon, or other fruit juices, which, while perhaps not acid in themselves, have been rendered acidulous by charges of carbon dioxide. While the carbonated and mineral waters have the greatest effect in eliminating waste matter from the system they are not so useful in this regard as the hot drinks, like tea, coffee, or even hot water, for they not only play their part in the elimination of waste but also cool the body by increasing the perspiration.

Particularly soothing are such mucilaginous or gelatinous liquids as barley water, flaxseed tea, and Irish moss. The mineral waters, malt liquors and light wines act with a tonic effect; the more common beverages, like tea and coffee and the milder alcoholic liquors are stimulating to the nerves, while tea and coffee, if milk and sugar are added, as well as chocolate, cocoa and the malt liquors may be classified as the nutritive drinks.

Next in popularity to milk are those unfermented beverages which are made from products of the vegetable world such as tea, coffee, cocoa, and chocolate. Although cocoa is by far the most ancient of these drinks, having been

in use long before the stimulating qualities of either tea or coffee were discovered, coffee has long been in greatest demand. In fact, it has been estimated that about 500,000,000 people drink coffee daily, as against the 100,000,000 who drink tea, and the 60,000,000 who partake of chocolate and cocoa. In the United States alone some 500,000,000 pounds of coffee are consumed annually, as against 90,000,000 pounds of tea, and some 20,000,000 pounds of the various preparations of cocoa and chocolate.

There are several points of resemblance between all these table drinks, dissimilar as they are in appearance and flavor. In each case they exercise a stimulating effect, the caffeine of coffee and theine of tea being almost identical, while the theolonsine of chocolate and cocoa is but a slightly different principle. Each also contains the same bitter principle, tannin, and each owes its characteristic odor and flavor to an essential oil.

Coffee, which must be considered first, because of its great popularity, is the berry from the several species of the genus *Coffea*, of which *C. arabica* is the most important. First used in Abyssinia during the 9th century, it was later introduced into Arabia, and from there to Constantinople, where it had become popularized by the middle of the 16th century. It is supposed that it was Leonhard Rauwolf, a German physician, who introduced coffee into Europe in 1573. A few years later Prosper Alpinus brought some of the beans to Venice to use them as a drug, but it was many years before it was drank to any extent outside of Constantinople. In 1652, however, a coffee house was opened in London by the Greek servant of a merchant named Edwards, whose ships sailed to the Levant, and since that time the popularity of the beverage has never waned.

In its preparation as a drink coffee should not be boiled in water, but, instead, should be covered with water that has previously been boiled. Here it should be allowed to infuse for fully ten minutes, at a temperature little below the boiling point. As coffee does not contain as great a quantity of tannin as tea and does not yield it so readily, it may infuse longer without becoming bitter and indigestible, the effect which tannin exerts if it is boiled or left for too long a time over the fire.

Like many other beverages coffee exercises both good and evil effects upon the system. Stimulating the muscles, heart and nerves, its tendency is to overcome the ills of fatigue, while its strengthening effect upon the heart's action makes it a most valuable stimulant. At the same time its action upon the nervous system is so marked that over-indulgence in the drink is certain to be attended by such ill effects as insomnia, and nervous headaches, if not palpitation and general nervous disability.

Tea, which stands next to coffee as a table beverage, is a native of China where these shrubs of the *Camellia* family have been cultivated for more than a thousand years. It was once a general belief that there were many kinds of tea plants, but Robert Fortune, the botanist, exposed the myth by his thorough investigation of the various methods of cultivation and manufacture in use in the tea districts of China and India. It is now known, therefore, that while there are many variations in the tea plant, the varieties are all the same plant cultivated under

BEVERAGES

different conditions, while the two distinctive varieties, the green and the black tea, are the results of different methods of manufacture. Green tea, for example, is prepared by steaming the leaves before they have been rolled and dried, a method of procedure which produces a greater quantity of tannin.

As the flavor of tea as a beverage depends as much upon the quality of the water in which it is infused as upon the method of infusion, care should be taken to see that the water is neither too soft nor too hard, and that it has been well boiled before it is poured over the tea. The period of infusion, which is then continued at a lower temperature, should not last more than a few minutes, for the longer the infusion the greater the quantity of tannin that will be extracted.

Like coffee, tea has its good and evil effects. If infused too long it becomes bitter, unwholesome and indigestible. If drunk too freely it not only induces insomnia and kindred nervous disorders but irritates the stomach, producing a serious kind of catarrh. At the same time it is a mild stimulant which refreshes the body and prepares the brain for intellectual energy. It is also beneficial in aiding one to withstand the ill effects of cold, fatigue and hunger. By producing perspiration it cools the body when heated, and, by means of its action upon the heart, it warms the body when cold.

While tea has been consumed in China and other parts of Asia since the latter part of the 6th century it was not introduced in European countries for more than one thousand years. Pepys mentions having tasted it for the first time in 1660, but the novel beverage must have met with almost instant recognition for, less than 18 years later, it was in general use in every part of England.

As both cocoa and chocolate contain starch and fat in considerable quantities they are among the most nutritious of the stimulating table beverages. Both are obtained from a small evergreen tree, native to tropical countries, for while the cocoa of commerce is prepared by grinding the seeds themselves, the commercial chocolate cakes contain the better parts of the berry, usually mixed with sugar and some distinctive flavoring. The preparation of the drink is a simple process, the cocoa or chocolate merely being dissolved in milk and boiling water.

Although by no means so popular as tea or coffee the drinking of mineral waters has become so general during the past century that they must now be regarded as among the most important temperance beverages. Early in the 16th century an attempt was made to produce artificial mineral waters, but it was not until the 18th century that chemistry had made sufficient progress to enable the experimenters to prove the elementary compounds of the waters both as to quality and quantity. In fact, the first unqualified success in this line of investigation was made by Dr. Frederick Adolphus Augustus Struve, a Dresden druggist, who celebrated his achievement by opening an artificial mineral water pavilion in that city, in 1820.

The alkaline and mineral waters which are so much in use to-day owe their distinctive characteristics to the preponderance of carbonate and bicarbonate of sodium as well as to the carbonate of potassium, lithium, calcium and magnesium which they contain, all of which tend to make

them useful aids to the physician in the treatment of disease. The Vichy of France, for example, or the Ems of Germany, are extensively used in the dietetic treatments, correcting disorders of the stomach and acting as alkalizers of the blood, bile and urine. In cases of gout, gall stones, rheumatism, dyspepsia, constipation, etc., they have proved of invaluable service and have also been used successfully in the treatment of obesity. In many instances their value as medicinal agents is enhanced by the addition of carbon dioxide, while, in other cases, they are made more palatable and easy of digestion by being served with milk. Among the natural mineral waters produced in this country are those of Saratoga, N. Y., Saint Louis, Mich., and Waukesha, Wis., all of which are well and favorably known to those who make use of such beverages.

Another class of drinks, the popularity of which is beyond question, are those beverages which contain alcohol as an active principle: beer, ale, wine, cider, and the many kinds of spirituous liquors that are now manufactured in almost every part of the world. In addition to the alcohol these beverages also contain such properties as tannin, sugar, carbon dioxide, or various acidulous substances, any or all of which exert an influence over the flavor of the liquid. As to alcohol itself it has so long been a bone of contention that it would be folly to attempt to review a century-long contest in a single article. Originally used exclusively as a medicine, and admittedly a valuable agent in the treatment of certain diseases it is to be doubted if even the moderate use of such liquors as beverages is not productive of far more evil than good, while the effect of immoderate indulgence in such liquid stimulants is too well known to require further discussion. In spite of all the warnings of science, however, man continues to gratify his craving for alcoholic preparations. Even in countries where the ordinary beverages of commerce are unknown, savage taste has learned to delight in the flavor of fermented liquors, and this desire even the most barbaric people have had ingenuity enough to gratify.

Beer, or lager, as it is more generally known in this country, is by no means a modern invention and no drink has continued to maintain a more steadfast hold upon the taste of man since the earliest days of civilization. The Egyptians manufactured beer from barley many hundred years before the Christian Era. Archilochus, 700 B.C., shows that the Greeks had learned the art of brewing, while we have such eminent authorities as Sophocles and Æschylus, Diodorus and Pliny to prove that the Greeks and Romans both made beer and loved it. Like the Gauls, the Romans called it *Cerevisia*, from Ceres, the goddess of field fruits, and there is ample history to prove that the art of making this beverage was known to man fully as early as the art of making wine from the grape. Prior to the invasion by the Romans the Britons were drinkers of milk and water although they occasionally drank mead, an intoxicating beverage made from honey. As Tacitus tells us that beer was the ordinary drink of the Romans, and beer and vinegar the favorite beverage of the soldiers of Julius Cæsar, it is not difficult to imagine why, so soon after his invasion, the Britons became a nation of beer-drinkers. Unlike the Romans,

BEVERAGES

however, they employed wheat instead of barley in their malting. In Germany, too, beer was introduced at a very early date. Charlemagne loved it dearly and not only compelled the best brewers in the land to become attachés of his court, but gave his personal attention to the subject so conscientiously that he was able to tell them how to improve their brew. As early as 1482 the monasteries of that country began to make beer and, by the 16th century, that beverage had become one of the chief exports of the country. In fact, the German brewer has always been recognized as one of the best beer makers of the world and it has only been within the past century that the success of their Austrian rivals has had a tendency to somewhat eclipse their glory. Centuries ago beverages known as beer were made in England by tapping such trees as the birch, maple, spruce, and ash for their juices, or by resorting to the properties contained in ginger and other roots, a practice which not only still prevails in that country, but that was brought to America by the first colonists, who loved these humble, harmless drinks too well to leave their recipes in the motherland.

Ale and porter, the heavier malted liquors which are so much used in England and the United States, cannot boast such ancient lineage as beer, but still there is reason to believe that it was a beverage like ale on which the Anglo-Saxons and the Danes loved to become drunken, and, fully as early as the reign of Henry II., the monks of England had become famous for their wondrous brews. In fact, it was due to the investigations of some of these fathers of the monasteries that the superior quality of the waters of Burton-on-Trent for brewing purposes was discovered, a discovery that has made the ales and porters of England world celebrated.

Wine, whose history is as old as that of civilization, is the most aristocratic of drinks. Ascribed to the gods by the ancients—to Dionysus by the Greeks, Bacchus by the Romans and Osiris by the Egyptians—there can be no question but that the use of the juice of the grape as a beverage was one of the first discoveries of civilized man. It is true that the very ancient Romans did not know it at the time when even the Israelites had learned the secret of its production, but, later, wine-making in Rome became such a general enterprise that Emperor Domitian ordered half of the vineyards destroyed that the more necessary wheat might be raised in the place of the grape.

According to the best authorities Asia was the country in which the vine first grew without the aid of man, while Armenia and Eastern Pontus were the lands in which the cultivation of the grape was first undertaken. From there the love of wine spread rapidly through all the lands of ancient civilization. Among the best known Asiatic wines was that of Chalybon, near Damascus, the beverages with which the tables of the Persian kings were constantly supplied, while the most famous Greek wines came from such places as Chios and Lesbos.

In ancient India and in Egypt priests were forbidden to drink, while the Jewish priests were only forbidden on days of religious services. In fact, the Hebrews were by no means as strict about the use of the wine cup as were some other nations and the fact that vine-culture was one

of their favorite occupations is proved by history, both biblical and profane. Traditions state that it was the Phoenicians, the earliest of vine-growers, who carried the secret of wine making to Spain, Italy and France. They also established large vineyards on the islands of Chios, Mitylene and Tenedor.

As early as 550 B.C. the process of blending selected wines was known to the Carthaginians, while the ancient practice of adding turpentine to the wine for the purpose of preserving it was probably an invention of Italy. France, Spain, and Portugal are now the chief centres of vine-culture although the grape-growers in many parts of the United States, and particularly in the far Western States, have recently raised the making of wine to the dignity of a great American industry. Champagne, however, one of the most popular of wines, is a beverage of extremely modern invention when compared to other makes. Invented by Dom Perignon of Hautvillers about the beginning of the 18th century its use has become more and more general until it is now consumed by wine-lovers in all parts of the world. If wine is the most aristocratic, whiskey may be designated as the most democratic of drinks. Thoroughly cosmopolitan in character, in various countries it is distilled from various substances, but always, whether it is made from barley, corn, wheat, rye, or even from potatoes, it bears the same name and usually enjoys the same proportion of popularity. The word "whiskey" is a name that was bestowed upon this beverage by the Celts of Ireland and Scotland who began to make it about the middle of the 17th century. The word itself is a corruption of the Gaelic "uisge" (water), and closely interpreted means "strong water." In the beginning this drink was used almost exclusively as medicine but as soon as it had become introduced as a beverage it became a favorite drink throughout Great Britain, and while the word "whiskey" once referred only to the Scotch and Irish drinks of that name, the rye and Bourbon whiskeys of American manufacture are now consumed almost as generally as those made from recipes that have been handed down from the days of the ancient Celts.

Almost as strong as whiskey, brandy, the "brande-vin" or burnt wine, is a drink which is often used, both for medicinal purposes and as a beverage. Its name, as is indicated, was derived from the method of its manufacture, a formula for liquor making that has been followed for many generations and in many parts of the world. In Morocco the Jews use the refuse of the grape as well as such fruits as raisins, figs, dates and pears in its distillation, and they have become strongly attached to their strange drink because they believe that their freedom from that terrible disease, elephantiasis, always so common among the Mohammedans in that country, is due to the fact that they partake so freely of this unique spirit. Molière, in his travels, discovered a tribe on the Barbary coast which made excellent brandy from honey; in Persia it is the lees of the weaker sorts of wines that are distilled, and almost every country has its particular method of making this beverage. None of them, however, can compare in quality to the cognac of France, that rich distillation from wines which alone properly bears the name of "brandy."

Gin is another distilled liquor. It is made

BEVERIDGE

from rye, grain and malted barley, flavored with juniper-berries and sometimes with turpentine. It is also known as Hollands, and as Holland gin, these names being a relic of the days when the beverage was called Holland-Geneva, the word "gin" being a corruption of the word "Geneva." Although originally made in Holland it was soon introduced into England where it immediately became one of the most popular of drinks. Easily manufactured and always strong it could be sold so cheaply that it was finally found necessary to adopt strict legislative measures restricting its sale and consumption. Hogarth's horrible picture, 'Gin Lane,' which was one of the influences in bringing about the much needed reform, is said to have been but slightly an exaggeration of the actual conditions which existed in all the large English cities during the reign of gin.

Rum, formerly spelled as the French still spell it, "rhum," is a spirit which is distilled from the sugarcane juice, from the skimmings of the juice from the boiling house, or from the molasses mixed with the lees of former distillations. Although not so commonly used as some of the other strong liquors rum has been known both for its medicinal value and as a beverage ever since its introduction from the West Indies, more than a century ago.

The following are among the drinks which are not so generally known but which are in common use among the people of other countries:

Arrack, a drink manufactured widely in the East and West Indies, is much used by the natives. In making it it is sometimes distilled from the fermented juice of the palm tree, and sometimes from a combination of rice and molasses used in connection with the palm-tree juices.

Vodka, which is the chief source of intoxication in Russia, is a liquor which may be distilled either from rye or from potatoes.

In several parts of the world the sap of trees is called into requisition to satisfy the thirst for intoxicants. Pulque, for example, the beverage most commonly used in all Spanish-American countries, is made from the fermented sap of the aloe, while a somewhat different drink, called Tepache, is made by mixing sugar and water with this sap of the aloe, which afterward is allowed to ferment for a few hours only. In Tasmania the so-called "cider-tree" furnishes the bushmen with a means of intoxication. In this case the sap is of such a character that it may be drank as soon as it is drawn from the tree, in which state it is both refreshing and harmless, but when it is allowed to stand for some time it becomes an intoxicant of great potency.

The Soma of the Hindus is supposed by some to have been the original intoxicant of the human race. The Persians, who accept this tradition, revere the beverage as Haoma, while in India it is looked upon as the beverage of the mighty god, ever-giving new strength and new vigor. It is a milky fluid which is found in the climbing bindweed, and, when properly fermented, is extremely "heady."

Sake, the commonly used distilled liquor of Japan, is made entirely from rice, as also is Samshée, a drink used by the lower classes in China.

Kvass is the name of a sour beer much fa-

vored by the Russian peasantry. It is made from barley and rye, by a similar malting process as that applied to the manufacture of beer.

The natives of South America have a drink which they call Guarapo, which is made from the fermented juice of the sugarcane.

Chi-chi is the name of a peculiar kind of cider which is made by the natives of Patagonia. In brewing it, in the autumn when the apples are ripe, they dig large pits which they line and interline most carefully with hides in order that none of the juice may soak into the earth. Into these hides they throw the ripe apples which are left to decay and ferment until they are ready for use. It is then extremely intoxicating.

A drink called Kephir is drunk by the natives of the Caucasus. It is an effervescing milk-like liquid, the effervescence being caused by the introduction of horny, yellowish-brown masses called "Kephir-grains." Kern, who made a scientific examination of these grains, discovered that they were made of a rod-like bacterium and a yeast-like substance that was entirely unknown to him. Not unlike Kumyss in appearance and in taste, Kephir is far more intoxicating.

Kava, or ava, is a Polynesian drink which is made by macerating in water a portion of the root and stem of one of the piperaceæ.

There are several substitutes for tea in use in various parts of the world. In some of the Pacific Islands there are "tea-trees," while the natives of Tibet are very fond of their "brick tea," which is made from the offscourings and dust of the leaves and stems of the tea plants. It derives its name from the fact that the dust is pressed into hard, solid brick-shaped lumps, from which pieces are chipped off as they are to be used.

MILES BRADFORD,
Author of 'Carlotta and I.'

Beveridge, Albert Jeremiah, American lawyer: b. Highland County, Ohio, 6 Oct. 1862. He was brought up on a farm; graduated at De Pauw University; and engaged in law practice in Indianapolis. He entered political life in 1883, and soon won a reputation as an effective orator. On 17 Jan. 1899, he was elected United States senator for Indiana, as a Republican. Soon after his election he went to the Philippine Islands; made a thorough study of political and material conditions there; and, on the assembly of Congress in December following, delivered a thrilling speech in the Senate in support of the administration's policy concerning the new possessions in the East.

Beveridge, Kühne (COGHAN), American sculptor: b. Springfield, Ill., 31 Oct. 1877. She studied under Rodin in Paris and O'Donovan in New York, and in 1893 married Charles Coghlan. Her works have been exhibited in New York, London, and Paris. She obtained honorable mention at the Paris Exposition of 1900.

Beveridge, William, English divine: b. Barrow, Leicestershire, 1637; d. Westminster, 1708. He studied at St. John's College, Cambridge, devoting his attention particularly to Oriental literature. In 1658 he published a work on Eastern tongues, especially Hebrew, Chaldee, Syriac, Arabic, and Samaritan, accom-

BEVERLEY — BEVIS

panied with a Syriac grammar. In 1660 he took orders, and obtained the vicarage of Ealing in Middlesex, where he wrote a useful 'Introduction to Chronology.' In 1672 he was appointed to the rectory of St. Peter, Cornhill, London, and the same year published his 'Synodicon' in two folio volumes, containing the Apostolic canons, decrees of the councils received by the Greek Church, and the canonical epistles of the early Fathers. This work called forth an opponent, to whom Beveridge replied in a 'Vindication.' In 1674 he obtained a prebend in St. Paul's, and in 1681 was appointed archdeacon of Colchester. In 1684 he became prebendary of Canterbury, and in 1688 was appointed chaplain to William and Mary. Shortly after, the see of Bath and Wells was offered him; but as it had become vacant by the conscientious refusal of Bishop Ken to take the new oaths, Beveridge, to his honor, declined to accept it. The episcopal dignity, however, was only delayed; in 1704 he became bishop of St. Asaph. Among his best-known works are 'The Church Catechism Explained'; 'Private Thoughts upon a Christian Life'; and 'The Great Necessity and Advantage of Public Prayer and Frequent Communion'. Collective editions of his works were published in 1824 and in 1842-6.

Beverley, Saint John of, English divine: b. about the middle of the 7th century at Harpham, Yorkshire; d. Beverley, 721. He was educated at Canterbury under Archbishop Theodore, and became a monk under Hilda in the monastery founded by her at Whitby. In 687 he was appointed to the see of Hexham, and in 705 was transferred to York. He founded a convent of nuns at Beverley, and built the choir of the church there. He resigned his bishopric and retired to Beverley in 718. Bede, who is said to have been his pupil, speaks of him with great veneration. He was canonized in 1037, and his remains were placed in a costly shrine, in Beverley minster. His fame was so widespread that when William the Conqueror led his army to the north and ravaged the country he saved the town of Beverley out of respect to the memory of the bishop. In 1416 Archbishop Chicheley ordered the anniversary of his death to be celebrated as one of the festivals of the Church, and special privileges were conferred on his church at Beverley by several English sovereigns. He is said to have written an 'Exposition of Luke' and 'Homilies on the Gospels.'

Beverley, Constance de, in Scott's poem 'Marmion,' a nun who for love of Marmion follows him in the disguise of a groom, and on being thrown over by Marmion is immured at Holy Isle for breach of her vow of chastity.

Beverley, Robert, American historian: b. Virginia, 1675; d. 1716. He was educated in England and about 1697 became clerk of the Council of Virginia and had charge of the records of the colony. He was the author of a 'History of the Present State of Virginia,' published in 1705, a most interesting account of the details of the daily life in colonial Virginia. A reprint was published in Richmond in 1855.

Beverley, England, a municipal borough and capital of the East Riding of Yorkshire, 29 miles east-southeast from York and a mile from the river Hull. It stands on the eastern edge of the Wolds, and on a branch of the

Northeastern Railway, and consists of a principal street above a mile in length, and several minor streets, all spacious and tolerably well built. Its most remarkable edifice is the minster of St. John, in the Decorated and Perpendicular English styles, and one of the finest specimens of ecclesiastical architecture in the kingdom, its west front in the opinion of excellent authorities surpassing in magnificence that of York minster. Other churches are St. Mary's and St. Nicholas'. Among the other chief buildings are the guildhall and corn exchange. The chief manufactures are leather, iron castings, agricultural implements, whiting, linseed oil and cake, manures, wagons, cement, and ale. Its environs abound with beautiful walks. It sent two members to Parliament till disfranchised in 1870. Pop. (1901) 13,185. See Hiatt, 'Beverley Minster' (1900).

Beverly, Mass., a city in Essex County, on the Boston & M. R.R.; two miles north of Salem. It was founded 14 Oct. 1668; was incorporated as a city 23 March 1894; contains several villages; and is connected by trolley lines with Salem, Peabody, Gloucester, and Wenham. It is the seat of the New England Institute for the Deaf and Dumb; is principally engaged in the manufacture of women's boots and shoes, and leather; has considerable shipping and fishery interests; contains high and graded schools, a public library, a national bank, a number of handsome residences belonging to Boston business men; and has a property valuation exceeding \$16,000,000. Pop. (1900) 13,884.

Beverly Farms, a name given to the eastern portion of the town of Beverly, Mass. It is a favorite summer residence for wealthy Bostonians and contains many beautiful mansions and park-like estates. In recent years it has endeavored to secure incorporation as a separate town.

Beverly's Ford, Va., scene of a sharp cavalry fight during the Civil War, between Buford, Pleasanton, and Gregg, commanding 9,000 Federals, and Stuart leading 12,000 Confederates. Hooker had sent Pleasanton to find Stuart, who was said to be near Beverly's Ford. Pleasanton planned to surprise the Confederates, but his plan miscarried. Stuart was fully prepared for him. Pleasanton was badly beaten. This action is also known as the battle of Brandy Station.

Be'vis of Hampton, Sir, a legendary English knight who has been made the hero of mediæval romances by both English and Continental writers. He was the son of Sir Guy, Earl of Hamtoun, who was treacherously murdered by Diyoun, emperor of Almayne, he was given by his false mother to some heathen merchants to be sold for a slave among the Paynim. By them he was carried to Ermony, where he soon became dear to King Ermyn, and dearer still to his only daughter, the lovely Josian. His chief exploits were the overthrow of Brademond of Damascus, of a monstrous boar, of the giant Ascapard, whom he spared to become his squire, and of a dreadful dragon near Cologne. His famous sword "Morglay" he won in battle; his horse "Arundel" was the gift of Josian. Still more romantic episodes in his story are his carrying his own death-warrant in a sealed letter to the vassal Brademond; his escape from his noisome dungeon after seven years' imprisonment; and recovery of his wife,

who had preserved his love, though nominally the wife of King Ynor of Mombraunt. He next returned to England to avenge his father's death, then sailed for Ermony and defeated Ynor in a desperate battle. His last great fight was in the streets of London, when he slaughtered 60,000 citizens and forced King Edgar to grant him terms. Thirty-three years he then spent in love and perfect happiness at Ermony, dying at the same moment as his wife, while his famous steed Arundel had died just before. The romance was edited by Dr. E. Kolbing for the Early English Text Society in 1885.

Bewick, bū'ik, Thomas, English wood-engraver: b. Cherryburn, Northumberland, 12 Aug. 1753; d. Gateshead, 8 Nov. 1828. He early showed a great talent for drawing, and was apprenticed to an engraver in Newcastle. The celebrated Dr. Hutton, of Woolwich, then a schoolmaster in Newcastle, was preparing his great work on mensuration, and having employed Bewick's master in getting up the woodcuts for illustrating it, the execution of these was entrusted to the young apprentice. Bewick performed the work so admirably that his master advised him to turn his attention to wood-engraving, and accordingly with this view he proceeded to London. He returned, however, to Newcastle after a short time, and established himself there in partnership with his former master. His turn of mind led him to the study of natural objects, more especially animals; and in 1790 appeared his 'History of Quadrupeds,' the beauty of the illustrations of which attracted universal attention, so superior were they to anything hitherto produced by the art of wood-engraving. In 1797 appeared the first, and in 1804 the second volume of his 'British Birds,' generally regarded as the finest of his works. Bewick has never been surpassed in his spirited delineations of animals, and the admirable naturalness with which the accessories and backgrounds of the drawings, such as foliage, grass, and other rural objects, are represented. The tail-pieces to chapters throughout his works are of the highest excellence, and often display a rich vein of humor. His illustrated edition of 'Æsop's Fables' appeared in 1818. See Clement, 'Painters, Sculptors, Architects, and Engravers' (Boston, 1899); Dobson, 'Thomas Bewick and His Pupils'; Tytler, 'Modern Painters.'

Bewley, Anthony, American abolitionist b. Tennessee, 22 May 1804; d. Fort Worth, Texas, 13 Sept. 1860. A Methodist clergyman opposed to slavery, in 1858 he was driven from Texas for preaching according to his convictions. Against the advice of friends he returned in 1860, but remained only a few weeks, being again obliged to flee for his life. A reward of \$1,000 was offered for his apprehension; he was seized in Missouri, carried to Fort Worth, and there hung by the mob, the only reason for whose act was that he had maintained human slavery to be unjust.

Bey, bā, among the Turks, signifies a governor of a town, seaport, or small district. The Turks write the word beg (q.v.).

Beyer, bi-ër, Samuel Walker, American geologist: b. Clearfield, Pa., 15 May 1865. He graduated at Iowa State College, 1889, and at Johns Hopkins University 1895. He is professor of geology and mining engineering in Iowa

State College. As special assistant on the Iowa Geological Survey he has prepared reports on the geology of Boone, Marshall, Story, and Hardin counties, and annual reports on the mineral productions of the State. In 1897 he was a delegate to the International Geologic Congress at St. Petersburg.

Beyle, Marie-Henri, bāl, mǎ-rē-ōn-re (pseudonym DE STENDHAL), French author: b. Grenoble, 23 Jan. 1783; d. 23 March 1842. He held civil and military appointments under the empire; took part in the Russian campaign of 1812; thence until 1821 lived at Milan, chiefly occupied with works on music and painting. After nine years' residence at Paris he became in 1830 consul at Trieste, and in 1833 at Civita Vecchia. In 1841 he returned to Paris, where he died. The distinguishing feature of his works was the application of acutely analytic faculties to sentiment in all its varieties, his best books being the treatise 'On Love' (1822); 'The Red and the Black' (1830); 'History of Painting in Italy' (1817); 'Racine and Shakespeare' (1827); and 'Life of Napoleon,' etc. A collective edition of his works appeared in 18 volumes in 1855-6, and his 'Correspondance Inédite' in two volumes in 1855.

Beyrout. See BEIRUT.

Beza, bē'za, or de Bèze, dè bāz, Theodore, Calvinistic divine: b. of a noble family at Vezelay, in Burgundy, 24 June 1519; d. 13 Oct. 1605. He was educated in Orleans under Melchior Volmar, a German philologist devoted to the Reformation; and, early familiar with the ancient classical literature, he became known at the age of 20 years as a Latin poet, by his petulant and witty 'Juvenilia' (a collection of poems of which he was afterward ashamed). In 1539 he was made a licentiate of law, and went to Paris. He received from his uncle the reversion of his valuable abbey Froidmont, and lived on the income of two benefices and on property which he inherited from a brother. His habits were dissipated, but a clandestine marriage in 1543 recalled him from his excesses, and a dangerous illness confirming the intention which he had formed at Orléans of devoting himself to the service of the Reformed Church, he went to Geneva with his wife in 1547. Soon after he accepted a Greek professorship at Lausanne. During his 10 years in this office he wrote a tragic-comic drama in French, 'The Sacrifice of Abraham,'—which was received with much approbation; delivered lectures (which were numerous attended) on the Epistle to the Romans and the Epistles of Peter (which served as the basis of his Latin translation of the New Testament, of which he afterward published several editions); finished Marot's translation of the Psalms in French verse; and obtained to such a degree the confidence of the Swiss Calvinists that he was sent in 1558 on an embassy to the Protestant princes of Germany to obtain their intercession at the French court for the release of the Huguenots imprisoned in Paris. In the following year he went to Geneva as a preacher, and soon after became a professor of theology and the most active assistant of Calvin, to whom he had already recommended himself by several works, in which many of the views of that eminent theologian were advocated with great zeal and no small measure of ability, so that he was generally regarded as Calvin's ablest

coadjutor, and the person destined to be his successor. His talents for negotiation were now often put in requisition by the Calvinists. He was sent to the court of Anthony, king of Navarre, at Nerac, to obtain toleration for the French Huguenots; and at his desire he appeared, 1561, at the religious conference at Poissy, where he spoke in behalf of his party with a boldness, presence of mind, and energy which gained him the esteem of the French court. He often preached in Paris before the queen of Navarre and the Prince of Condé; also in the suburbs. At the conference of St. Germain, in 1562, he spoke strongly against the worship of images, and after the commencement of the civil war accompanied the Prince of Condé as chaplain, and on the capture of the prince joined Admiral Coligny. After the restoration of peace he returned to Geneva in 1563, where, besides discharging the duties of his offices, he continued to engage in theological controversies in support of the Calvinists; and after Calvin's death in 1564 became his successor, and was considered the first theologian of this Church. He presided in the synods of the French Calvinists at La Rochelle (1571) and at Nismes (1572), where he opposed Morel's proposal for the alteration of clerical discipline; was sent by Condé (1574) to the court of the Elector Palatine; and at the religious conference at Montpelier (1586) opposed the theologians at Wurtemberg, particularly James Andreas. At the age of 69 years he married his second wife (1588), and still continued to repel, with the power of truth and wit, the attacks and calumnies which his enemies, apostatized Calvinists (such as Bolsec), Lutherans, and Jesuits, heaped upon him. They reported in 1597 that he had died, and returned before his death to the Roman Catholic faith. Beza, now 78 years old, met his assailants in a poem full of youthful enthusiasm, and resisted in the same year the attempts of St. Francis de Sales to convert him, and the alluring offers of the Pope. In 1600 he visited Henry IV. in the territory of Geneva, who presented him with 500 ducats. Among his many works, his exegetic writings, and the able and correct 'History of Calvinism in France from 1521 to 1563,' which is ascribed to him, are still much esteemed. Beza's name is associated with the Codex which he presented to the University of Cambridge, for an account of which see BIBLE.

Beza's Codex. See BIBLE.

Bezant, a round, flat piece of pure gold, without any impression, supposed to have been at one time the current coin of Byzantium. Bezants are frequently employed as one of the charges in heraldry, a custom supposed to have been introduced by the Crusaders. Its value was about \$2.

Beziers, *bā-zē-a*, France, a town in the department of *Hérault*, 38 miles southwest of Montpelier; situated on a height above the Orb, and on the Canal du Midi, a few miles from the Mediterranean, to which there runs a tramway line. It is surrounded by old walls, and though its streets are narrow, it is tolerably well built. Its most conspicuous edifice is the cathedral, a Gothic structure, crowning the height on which the town stands, and possessing a fine semicircular choir surrounded by columns of red marble. Its manufactures consist chiefly

of woollens, silks, hosiery, chemicals, spirits, etc. In 1209 it was the scene of a horrible massacre of the Albigenses. The abbot of Cîteaux, who with the bishop of the district headed the murderers, apologizes in a letter to Pope Innocent III. for not having slain more than 20,000. Pop. (1896) 48,012.

Bezique, a card game which crystallized into official form in 1887. Two packs of cards are used, two players participate and the cards rank, ace high, then ten, king, queen, knave, nine, eight, and seven. All cards below that are discarded from both packs. Eight cards are dealt to each player. Trumps may be determined either by turning up the first card of the stack or by the suit of the first marriage. The non-dealer leads for the first trick, and the winner of each trick has the succeeding lead. After each trick, each player draws one card from the top of the stack, the winner of the trick taking the top card. The playing is as in whist, the leader taking the trick unless his opponent plays a higher card of the same suit or a trump. It is not necessary to follow suit until the stack is exhausted, when one must do so and take each trick, if possible. Counting is done by means of the values of the cards; each ace or ten-spot taken in a trick counts 10, the winner of the last trick of each hand scores 10, and if the trump is turned, both sevens count 10 for the turner, and if one exchanges from his hand a seven of trumps for another turned trump or if one declares the other seven of trumps 10 more is scored. The game is won by the player who first makes 1,000 points, and if his opponent has not made 500 the game counts double. There are certain combinations of cards other than the above, which, when declared, count as follows: Double bezique (both queens of spades and both knaves of diamonds) 500; sequence of five highest trumps, 250; and 4 aces, 100; any 4 kings, 80; any 4 queens, 60; any 4 knaves, 40; bezique (queen of spades and knave of diamonds), 40; royal marriage (king and queen of trumps), 40; marriage (king and queen of same suit), 20. A declaration is made by placing the declared cards face up on the table where they remain till played or the stack is exhausted, except in the case of the seven of trumps. To score, a declaration can only be made after winning a trick and before drawing, and but one declaration can be made at a time. After a card has been used in one combination it may be used to form another, excepting when used to form an equal or inferior combination in the same class as before. A player need not declare a combination which he holds and only before the stack has been exhausted can a declaration be made. Consult: A. Howard Cady's treatise, for details and rules.

Bezo'ar, concretions found in the fourth stomach of many of the *herbivora*, notably goats, at one time held in high repute because of fancied miraculous healing properties.

Bhadrinath, *bhā-drī-nāth'*, a town in northern Hindustan, on the Bishengunga, celebrated for its temple of Vishnu, with a hot mineral spring in whose waters both sexes bathe indiscriminately, to wash away their sins. Some 50,000 pilgrims visit the place annually. The temple has been frequently overthrown by earthquakes. The principal idol is a figure of black

BHAGALPUR — BHILS

marble, clothed in gold and silver brocade while the season of pilgrimage lasts, and then stripped and stowed away in a vault the rest of the year. The Hindus believe that in the neighboring mountains some holy anchorites have lived for several thousand years. Their place of habitation is a cavern perpetually choked with snow, which forbids the approach of the curious and the skeptical. The Bhadrinath peaks in the neighborhood are above 22,000 feet high.

Bhagalpur, b'hā-gāl-poor', a city of Hindustan, in Bengal, capital of a district and division of the same name, situated on the Ganges, 113 miles northwest of Moorshedabad. In the town and neighborhood are some interesting Mohammedan shrines; and there are here also two monuments, one erected (in 1780) by natives, and the other erected by government in memory of Augustus Cleveland, the conciliator of the formerly turbulent and marauding hill tribes of Sonthals. There are several indigo works in the neighborhood. Pop. (1901) 75,275. The division of Bhagalpur lies between that of Rajshahi on the east and that of Patna on the west. It has an area of 20,511 square miles. Pop. (1901) 8,721,484. The district of Bhagalpur is fertile, well watered, and highly cultivated. It is divided into two unequal portions by the Ganges. Area, 4,226 square miles; pop. (1901) 2,088,560.

Bhagavadgita, bha'gā-vād-gē'ta (Sanskrit, the Divine Song), the title of a religious-philosophical didactic poem interwoven as an episode in the great Indian epic of the Mahābhārata (q.v.).

Bhamo, bha-mō', India, a town of Burma, on the Upper Irrawaddy, about 40 miles from the Chinese frontier, and 180 north-northwest of Mandalay, with which it has railway communication. About 20 miles above Bhamo the river suddenly narrows from 1,000 to 150 yards and flows through a rocky gorge subject to eddies and back-waters. Navigation is at that point very difficult, and at times impossible. Bhamo is the starting-point of caravans to Yunnan, and will become one of the great emporiums of the East in the event of a regular overland trade being established between India and Western China. Pop. (estimated) about 7,000.

Bhang, bāng, an Eastern name for hemp (*Cannabis Indica*) (q.v.).

Bhartpur, bhért-poor', or **Bhurlpore**. (1) A native state of India with an area of 1,961 square miles. The surface is generally low and the state is scantily supplied with water; soil generally light and sandy; chief productions, corn, cotton, sugar, and salt. It has been under British protection since 1826. Pop. (1901) 626,000. (2) A town, the capital of the above state, on an extensive and fertile plain, 110 miles south-southwest of Delhi. It covers an area about four miles in circuit, and was so strongly fortified that in 1805 it stood a siege by Lord Lake of 14 weeks, and cost the besiegers 3,100 men. In a second siege, in 1826, its resistance to Lord Combermere was less successful. The fortifications have been demolished, but the fort still exists, and is enclosed by a wet ditch and a wall of hewn stone, which taken together are 60 feet high. Within the fort is the rajah's palace, built of red and yellow freestone in the

Mogul style, and picturesquely crowning an eminence surrounded by flower-gardens and fountains. Pop. (1901) 43,000.

Bharttrihari, bhār-tre-hā're, Indian poet, author of a book of apothegms. According to the legend he was the brother of King Vikramāditya, who lived in the 1st century B.C. The collection of 300 apothegms (short poems) bearing his name present us with graceful descriptions of nature, charming pictures of love, shrewd remarks on everyday life, and profound thoughts on the Deity and the immortality of the soul. Bharttrihari was the first Indian writer who became known in Europe, 200 of the apothegms having been translated by the missionary Abraham Roger and published at Leyden (1653). His actual personality has been much discussed without any very satisfactory conclusion having been reached. The weight of opinion inclines to belief in his existence, and that he was a poet of a philosophical cast, possibly a grammarian also, and very likely of royal descent. See Von Bohlen, 'Bharttrihari's Sententiæ' (1833); Tawney, 'Two Centuries of Bharttrihari' (1877); Wortham, 'Translation of the Satakas of Bharttrihari' (1886); More, 'A Century of Indian Epigrams. Chiefly from the Sanskrit of Bharttrihari' (1898); Kale and Gurjar, 'Nīṣaṭaka and Vairagysataka, with Notes and an English Translation' (1898).

Bhatti, bhat'te, Indian epic poet of the 6th or the 7th century. His poem, named after him, 'Bhāṭṭikāvyaṃ,' is in 22 cantos. Its theme is the deeds of Rāma; but the author designed the work to be also an exemplification of the rules of grammatical and rhetorical composition. It was published with a two-fold commentary at Calcutta (1828).

Bhavabhūti, bhā-va-bhoo'te, surnamed **Srī-Kantha**, Indian dramatist, of the first half of the 8th century. He wrote at least three plays, the 'Mahāvīracarita' ('life of the great hero'), and the 'Uttararāmacharita' ('later life of Rāma'), forming together, in seven acts each, a dramatized version of the story of the Ramayana; and the 'Mālatī-mādhava,' a domestic drama in ten acts, full of life and incident. Bhavabhūti is often compared with Kālidāsa, whom he equaled in vigor and variety, but hardly in genius. All three plays have been translated into English. See Lévi, 'Le théâtre indien' (1890).

Bhawalpur, bha-wal-poor', or **Bahawalpur**, a state of the Punjab, British India, south of the Indus and Sutlej rivers. It is chiefly a desert of shifting sand. Only the river banks are cultivable. The inhabitants are Jāts, Baluchis, and Afghans, the greater part Mohammedans. Area, 17,285 square miles. Pop. (1901) 720,000. Bhawalpur, the capital, is on a branch of the Sutlej. It is enclosed by gardens and mud walls, four miles in circumference; noted for the manufacture of a kind of turban and scarf very popular among the Hindus; also produces considerable woolen, silk, and cotton cloth, indigo, alum, and saltpetre. Pop. 14,000.

Bhils, bēls, or **Bheels**, a Dravidic race inhabiting the Vindhya, Satpura, and Satmala Hills, a relic of the Indian aborigines driven from the plains by the Aryan Rajputs. They appear to have been orderly and industrious under the Delhi emperors; but on the transfer

BHILSA — BIANCHINI

of the power in the 18th century from the Moguls to the Marathas they asserted their independence, and being treated as outlaws took to the hills. Various attempts to subdue them were made by the Gaekwar and by the British in 1818 without success. A body of them was, however, subsequently reclaimed, and a Bheel corps formed, which stormed the retreats of the rest of the race and reduced them to comparative order. The hill Bheels wear little clothing, and live precariously on grain, wild roots, and fruits, vermin, etc., but the lowland Bheels are in many respects Hinduized. Their total numbers are about 750,000. See Rowney, 'Wild Tribes of India' (1882); Reclus, 'Primitive Folk' (1891).

Bhilsa, *bhīl-sa*, or **Bilsa**, a town of Hindustan, on the Betwa, 280 miles southwest of Allahabad. It has a fort enclosed by a ditch and a stone wall surmounted by square towers, and is a place of Hindu pilgrimage. One of the curiosities of the place is a brass gun measuring 19½ feet in length, with a bore of 10 inches; elegantly proportioned, highly ornamented, and said to have been made by order of the Mogul emperor, Jehangir. Fine tobacco is produced in the vicinity. In the neighborhood are some very large and remarkable ancient Buddhist monuments known as *topes*, one of the principal being a dome-shaped structure 70 or 80 feet in height. Pop. (1891) 9,700.

Bhima, *bē'ma*, **Beemah**, or **Bimah**, (1) a god in Hindu mythology, the son of Pritha (or Kunti) by Vayu, the god of the wind, remarkable for his great size and strength. (2) the name of a river of India rising in the Poona district of Bombay and flowing southeast to the Kistnah River, about 400 miles in length.

Bhiwana, *bhe-wā'ne*, a town of India in the Punjab, district of Hissar. It is the trading centre of its district, exporting metals, sugar, and spices. Pop. 35,000.

Bhopal, *bhō-pal'*. 1. A native State of central India, with an area of 6,874 square miles. The country is full of jungles, and is traversed by a hilly tract, forming part of the Vindhya Mountains. The soil is fertile, yielding wheat, maize, millet, pease, and other vegetable productions peculiar to central India. Sugar, tobacco, ginger, and cotton are the chief exports. The district is well watered by the Nerbudda, Betwa, and other minor streams. The state of Bhopal was founded by an Afghan adventurer, named Dost Mohammed Khan, who in 1723 succeeded in establishing himself here by the countenance of Aurungzebe, on whose death he assumed the title of nabob, which was retained by his successors. Bhopal has all along been friendly in its relations with the British. In 1818 the state was placed under British protection. Pop. (1901) 1,198,350; (2) a town, capital of the above state, on the boundary between Malwah and Gundwana, 108 miles east of Oojein. It was defended successfully in 1813 against the forces of Scindia and the rajah of Nagpore. It is surrounded by a wall two miles in circuit, and contains a fort. Outside is another fort on a large rock, the residence of the ruler of Bhopal. Among other buildings of note are two mosques, arsenal, mint, and the palace of the Begum. Large artificial lakes supply good water. Pop. (1891) 70,338.

Bhuj, or **Bhoj**, the chief town of Cutch in India, Bombay presidency, at the base of a fortified hill, with military cantonments, high school and school of art, mausoleums, of the Raos or chiefs of Cutch, pagodas, etc., including a temple dedicated to the cobra *di capello*. Bhuj is famous for its manufactures of gold and silver. Pop. (1891) 25,421.

Bhutan, *bhoo-tan'*, an independent State in the eastern Himalayas, with an area of about 16,800 square miles, lying between Tibet on the north and Assam and the Jalpaiguri district on the south, and consisting of rugged and lofty mountains, abounding in sublime and picturesque scenery. Pop. (estimated) 200,000. The Bhutanese are a backward race, governed by a Dharm Rajah, regarded as an incarnation of Deity, and by a Deb Rajah, with a council of eight. They are nominally Buddhists. After various aggressive incursions and the capture and ill treatment of Ashley Eden, the British envoy, in 1863, they were compelled to cede to the British considerable portions of territory, in return for a yearly allowance of £2,500.

Bia'fra, *Bight of*, a large bay on the west coast of Africa, at the head of the Gulf of Guinea, between Capes Formosa and Lopez. The principal rivers flowing into it are the Niger, the New and Old Calabar rivers, the Rio del Rey, the Cameroon, and the Gaboon; its islands are Fernando Po (Spanish), and St Thomas' and Prince's (Portuguese). Opposite Fernando Po are the Cameroons.

Bialystok, *byal-e-stōk'*, or **Bielostok**, a town of Russian Poland, province of Grodno, on the Bialy, 45 miles south-southwest of Grodno, with which and Warsaw it is connected by rail. It is a well-built, handsome town, with a spacious market, gymnasium, and several churches, and has among its edifices a palace which belonged to the counts of Branski, and was once known as the Polish Versailles. Its manufactures are woolen goods, leather, hats, soap, etc. Pop. (1897) 63,927.

Biancavilla, *byan-ka-vē'lla* (Italian *bianca*, white, and *villa*, town), a city of Sicily situated on the slope of Mount Etna, 20 miles northeast of Catania, founded in 1480 as an Albanian colony. Lava is employed for paving its streets, and in its neighborhood are the noted grottoes of Scila and Archi, the former basaltic, the latter in the lava of 1607 with a tunnel half a mile in extent. Wine and grain are produced in the district and all the cotton in this portion of Sicily is called Biancavilla. Pop. (1901) 13,358.

Bianchi, *byan'ke*, **Francesco** (called **IL FRARI**), Italian painter. b. Modena, 1447; d. 1510. He was the instructor of Correggio, according to Vidriani, and his works were esteemed for graceful design and agreeable coloring. Among his few works extant are a 'Madonna with Saints,' now in the Louvre. He must not be confounded with Federigo Bianchi, a Milanese artist, born about the end of the 16th century. The paintings of the latter are numerous in northern Italy, and are held in high esteem. He wrote a volume of biographies of painters.

Bianchini, *be-an-kē'ne*, **Francesco**, Italian astronomer: b. Verona, 13 Dec. 1662; d. Rome, 2 March 1729. He was intended for the clerical

profession, but repaired to Rome, and applied himself to jurisprudence, and continued the study of experimental physics, astronomy, etc., as well as of Greek, Hebrew, and other languages. Pope Alexander VIII. bestowed on Bianchini a rich benefice, with the appointment of tutor and librarian to his nephew, the Cardinal Pietro Ottoboni. Pope Clement XI. also patronized him, and appointed him secretary to the commission employed in the correction of the calendar. Being on a tour through France, Holland, and England, he formed the idea of drawing a meridian in Italy, from one sea to the other, in imitation of that which Cassini had drawn through France. He was occupied eight years at his own expense in that work; but other employments withdrew his attention from it, and it remained unfinished. He concluded his career with two important works (1727) on the planet Venus, and on the sepulchre of Augustus.

Biard, Auguste François, byär, â-güst frönswä, French genre painter: b. Lyons, 27 June 1801; d. near Fontainebleau, 8 July 1882. He traveled extensively, visiting Spain, Greece, Syria, Egypt, Mexico, Brazil, etc. Among his best known pictures are the 'Babes in the Wood' (1828); the 'Beggar's Family' (1836); the 'Combat with Polar Bears' (1839); and 'The Strolling Players,' now in the Luxembourg. A strong element of caricature runs through most of his works.

Biard, Peter, French missionary in America: b. Grenoble, 1565; d. 1622. He was one of the first two missionary priests sent to New France, and with his companion, Masse, on 10 June 1611, he wrote the earliest letters sent by the Jesuit order from Canada. He at once began a study of Indian languages, established friendly relations with the Indians on the Kennebec in 1612, and in 1613 founded a colony on the island of Mount Desert. The colony was soon destroyed by the forces of Argall, deputy governor of Virginia, and Biard, being captured, was sent to England. This enterprise of Argall's marks the actual beginning of hostilities between the French and English in North America. Biard was liberated after a short time, and returning to Lyons, published in 1616, 'Relation de la Nouvelle France, et du Voyage des peres Jésuites dans cette Countrée.' This is the earliest of the 40 volumes of 'Jesuit Relations' (1632-72), which are such valuable storehouses of material for early American history.

Biarritz, bya-rêts, a fashionable watering place of France, department of Basses-Pyrénées, five miles south of Bayonne. It is a favorite of bathers and other persons who come from all parts of Europe, and especially of the Basque mountaineers, who deem it an obligation to drink of the mineral waters once a year, as well as to bathe in the sea of Biarritz. In 1856, the place acquired additional importance from being made the summer residence of Napoleon III and his court. Since then its popularity both in winter and summer, has steadily increased. It has no industries and is composed almost entirely of hotels and lodging houses. Pop. 12,000.

Biart, byär, Lucien, French novelist, poet and writer of travels: b. Versailles, 21 June 1829. He published a number of novels, containing masterly descriptions of Mexican and South American nature and customs. Among

his works are 'The Mexican Women' (1853), poems; 'Adventures of a Young Naturalist' (1869); 'The Clients of Dr. Bernagius' (1873); 'Across America' (1876).

Bias, bë'as, one of the seven wise men of Greece: b. Priene, one of the principal cities of Ionia, about 570 B.C. He was a practical philosopher, studied the laws of his country, and employed his knowledge in the service of his friends, defending them in the courts of justice, or settling their disputes. He is said to have died at an advanced age immediately after successfully defending in court one of his friends. The inhabitants of Priene having resolved to abandon the city with their property, Bias replied to one of his fellow-citizens, who expressed his astonishment that he made no preparations for his departure—"I carry all that is mine with me."

Bibb, George M., American jurist: b. Virginia, 1772; d. Georgetown, D. C., 19 April 1859. He graduated at Princeton in 1772, and took up the practice of law in Kentucky. He was twice chief justice of the State court of appeals, served two years in the State senate, and was chancellor of the court of chancery. He was a senator in Congress, 1814-19 and 1829-35, and secretary of the treasury under President Tyler. During later life he practised his profession in Washington, D. C. He compiled 'Reports of Cases at Common Law and in Chancery in the Kentucky Court of Appeals' (1808-11).

Bibbiena, be-byä'na, **Bernardo Dovizio** (styled BIBBIENA), Italian poet: b. Bibbiena, 4 Aug. 1470; d. 9 Nov. 1520. For many years secretary to Cardinal Giovanni de' Medici, in whose election as Pope Leo X. he is said to have had a considerable share, he was appointed treasurer, and soon after raised to the dignity of cardinal (1513). In this dignity he became an ardent promoter of art and science. His comedy, 'Calandria,' is probably the earliest in Italian literature.

Bibbiena, Giuseppe, Italian painter: b. 1696; d. 1757. The most distinguished of the Bibbiena family, he was famed as architect, as well as an artist. Not only did he design gorgeous decorations for a court wedding at Munich in 1722 and a dazzling court festival in Prague in 1723, but he built the noted theatre at Bayreuth in 1757 and remodeled the opera house at Dresden. The 'Architettura e Prospettive' (1740) contains several illustrations of his works.

Biberach, bë'bë-räh, a town of Württemberg, on the river Riss, 22 miles south-south-west from Ulm. It is irregularly built, and with its old walls, still in part remaining, and its old towers and gateways, has a mediæval aspect. Among its buildings is a fine church, dating from 1100, and recently restored. The town has important educational institutions, and a richly endowed hospital. The French, under Moreau, defeated the Austrians near Biberach in 1796. There is a monument to the poet Wieland, who was born in the vicinity, and another to the Emperor William I. The town is noted for its bell foundries and manufactures of artificial flowers, leather, toys, and machinery. Pop. (1900) 8,400.

Bibiru, be-bë'roo, a tropical tree. See GREENHEART.

BIBLE

Bible. I. The word Bible comes from a Greek word meaning book. It has come to us through the Latin *Biblia*. This is in the Greek a neuter plural. But it came to be used as a feminine singular, and so gives us our word Bible. *Bibliotheca*, also a Greek word, meaning library, was a designation during the Middle Ages. Earlier Latin writers used the word "testamentum" or "instrumentum," both designed to translate the Greek word for covenant. In the New Testament the usual word to designate the Old Testament is "Scripture" or "Scriptures."

II. *Languages*.—The Old Testament was written originally in Hebrew, with the exception of brief portions in Aramaic, a closely kindred dialect, namely, Jer. 10:11, Ezra 4:8-6:18, 7:12-26, Dan. 2:4-7.28. The New Testament was written wholly in Greek.

III. *Divisions*.—The most striking partition in the Bible is into two Testaments, the Old and the New. This is due to the broad difference between the era of Hebrew Messianic hope and the actual appearance and work of Christ. All preceding Christ belongs to the Old and unfulfilled. All following Christ belongs to the New and complete. Within the Old Testament there has been marked from the time of the prologue to Sirach, 132 B.C., a three-fold division. These are the Law, containing the five Mosaic books; the Prophets, including the so-called Former Prophets: Joshua, Judges, I and II Samuel, I and II Kings; and the Later Prophets: Isaiah, Jeremiah, Ezekiel, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi; and the Kethubim, a Hebrew word meaning "Writings" (called also Hagiographa, a Greek word meaning "Holy Writings"): Psalms, Proverbs, Job, Song of Songs, Ruth, Lamentations, Ecclesiastes, Esther, Daniel, Ezra, Nehemiah, I and II, Chronicles. There are also smaller divisions made by the Hebrew Scribes, 200-400 A.D. These were called Parashas. The longest of these number 54 in the Pentateuch, and are designed for Sabbath reading. Corresponding with these 54 Mosaic sections there were 54 lessons selected from the Prophets, also for Sabbath reading, called Haptharoth. These divisions varied in number in different sections and times. The arrangement in books also shows variation. Some schemes give 24 books, so the Talmud; others give 22 books. The Septuagint and Vulgate versions reckon 39 books. This is now universal in Christian editions of the Bible, derived through the great edition of the Hebrew Bible by Jacob ben Hayim in 1525-6. The Talmud refers to still smaller divisions as Pesukim, nearly corresponding to our verses. In the manuscripts of the New Testament divisions appear very early. Such are traced to Tatian in the 2d century, to Ammonius in the 3d century, to Eusebius in the 4th century, to Euthalius in the 5th century. Our present chapter and verse divisions were completed by Robert Stephens in 1551, imitating Rabbi Nathan, c. 1437. Stephens' work was adopted by the Geneva Bible in 1560, and by the English version of 1611. The division into chapters originated with Stephen Langton, who died 1228.

IV. *Its Nature*.—The Bible, as it stands, is in the general judgment of Christendom a book altogether unique. Therein Christians look to find the very word of God. This divine message

they deem pure and full, and they gladly adopt it as a binding rule of faith and life. A central feature of the volume is its claim to divine origin. Here God speaks to men. Here men learn of God. This is the direct assertion or the evident implication of its burden everywhere. The covenant with Abraham was made by God. God spoke to Moses. Hebrew history was dominated by God. The messages of all the prophets were obtained from God. The great poetical works carry continually the postulate and the evidence of open fellowship with God. If this note seems lacking, as in Esther and much of Ecclesiastes, this fact raises unfliningly a question as to their being in their proper place. In Christ, as portrayed in the Gospels, this note finds most perfect utterance. Jesus of Nazareth is the Incarnate Word. He hath seen and known the Father; and of all the Father's words he is true and faithful Witness. And the Apostles are Christ's specially prepared heralds of this same heavenly word. They speak for Christ and God. There is in all their ministry the living presence of the exalted Christ. This is "the thesis of the New Testament." Thus throughout, the Bible makes a claim to be the very word of the true and living God. This is its prime trait. This determines its nature.

Touching this quality a few things need to be said. Only so can the Bible be defined. First, as to the nature of the Deity thus made known. He is a Person. He has every personal trait. He is free and wise and kind. He is faithful and gracious and pure. He is full of goodness and truth. He is Spirit. He is of all being the only life and essence and strength. There is in him no transition or decay or change. He is pure and very life. He is transcendent. By him all things are made and ruled and judged. He is a friend. With him all persons may find fellowship. He is holy. His very being is the very energy of infinite and unfailing truth and love. Such is God. His person is the central glory of the Bible. Herein the Bible is unique. Its deity stands in simple, infinite, spiritual majesty unveiled in every part of the record. This truth finds culminating utterances in Christ's words to the woman in John 4:24: "God is a spirit, and they that worship him must worship him in spirit and truth." This fundamental verity stands clear amid all the obscurity of Gen. chapters i.-xi., and all the bewildering mysteries of the closing Apocalypse. This teaching concerning God, more than anything else, gives the Bible its peerless tone and worth. And this teaching is not abstract. It stands in life. Most powerfully is it proclaimed in the great Theophanies. These present at once the glory and the power of the Biblical claim. And these Theophanies are not incidents. They have commanding prominence and embody mighty meaning. They are in every case outstanding landmarks and points of departure. They are typical scenes. They figure in the Biblical landscapes like beacons whose rays fall everywhere.

But these disclosures are all gathered up in Christ. His figure stands in the very centre of this book. On him all symbols and expectations and prophecies converge. In him all excellencies and dignities and graces combine. From him all instructions and commissions, all judgments and mercies proceed. In him the old

BIBLE

and the new are made to agree. He is the very Lord of very life and truth and love. In his person and word and work all the energies and all the intimations of every Biblical scene find an equilibrium that is absolute. In him all Biblical life finds at once free play and full repose. In him the Bible lies concealed. In him the Bible stands revealed. He is the Son and Word of God.

It follows and stands evident that the Bible is a book of life. It is a record of the interplay of wills. It is always dealing with persons. Its central values are moral. Its revelations look toward reform. It is a searcher of hearts. Its appeals are to men; and they are potent. If repulsed, then its rebukes throb with resistless force. It is always scanning character, feeling after conscience, working toward the will. It has an unexampled amount of comment upon righteousness and sin, merit and blame, law and obligation, responsibility and reprisal in the moral field. It is from cover to cover a book of ethics, practical ethics, but an ethics that finds all its roots and regulations in its pure and lofty views of God. God, the pure, the holy, the supreme, is the ethical norm. With him man has vital fellowship—man the godlike and finite, the perishable and immortal, the lord and the slave, the individual and the brother. As is instantly apparent, such being God and such being man, their moral interrelations are bound to be most complex. But just here again,—and this is why these facts are named,—the Bible is in its nature unique. Its values are real, true to life. Its ethics are genuinely ethical, never formal, never partial. Its views of character are balanced and vital and full. It fully recognizes the moral value of humility and aspiration, of truth and love, of isolation and friendship, of physical and spiritual in man. Here again Christ alone is norm—norm of ethics, norm of the religious life, norm of the earthly experience, norm of the immortal life. This balanced completeness of life is a most manifest and distinguishing mark of the Biblical view. Its moral estimates are at once a full-voiced echo and a final interpretation of the life of the world.

These vital moral estimates, while fully unified, fall apart into two most striking subdivisions. This is due to human sin. Because of this undoing two widely different notes resound throughout the Sacred Word, namely, judgment and grace. In one or other of these two forms the Bible may be defined as the adjustment to sin. Universal man has gone morally astray. Upon this perversion moral judgment surely impends. This doom may be inflicted, or delayed, or reversed. This is the inner sum of Biblical truth. This is the Bible within the Bible. Here lies the inner secret of the Bible's matchless power. Under its high beliefs concerning God and its broad and searching thoughts on man, it fashions and proclaims, as no other volume ever did, its estimates of three stupendous themes: the deep and dark iniquity of sin; the awful inevitableness of its proper doom; and the divine provision and proffer of saving, sacrificial grace.

But once again, it needs to be said, the Bible is a book of life. Its messages are all set in the midst of events. It uncovers and traces the flow of a stream of history. This historical factor needs minute attention in defining the

nature of the Bible. Here is a book always handling values of the highest, even absolute worth. But it is always setting them forth in simplest concrete forms. Its ideals, always phenomenally lofty and pure, are unfailingly in immediate touch with the real. Its events issue in the alternatives of eternity; but they always run along common historical paths. This striking feature, undeniably one secret of the Bible's strength, is as undeniably prolific of most vexing problems. As a storehouse of eternal principles for the moral and religious life, the Bible rises and stands beyond the reach of criticism, denial, or assault. But as a series and collection of historical events, it lies open on every side to every sort of historical challenge and test. Hence the Bible presents abidingly two widely diverse aspects—the ethical or theological, the philosophical or metaphysical, in a word the abstract; and the historical or literary, the natural or phenomenal, in a word the concrete. The former always challenges character. Its vesture and voice are imperial. It demands acceptance. To renounce its claim is to sin wilfully. The latter is always suggesting inquiry. It invites scholarly scrutiny. Multitudes of its problems hang in continual uncertainty. Hence the various phases of modern Biblical criticism.

Such is the Bible in its nature. It voices God's message to men. It reveals God's true being. It concentrates in Christ. It is a book of life, vivid, complete. Its attention is incessantly fixed on sin. It is enshrined in history. Its central religious and ethical teachings are fundamental postulates. They lie beyond the reach of fair debate. It is so embedded in incomplete and changing scenes as to provoke and sustain age-long debates. Some of the chief of these debates will be traced in succeeding sections of this article.

V. Genesis of the Old Testament.—A few general statements may be profitably made first. These will clear the way for a sketch of more special matters. The present Old Testament canon is substantially that adopted by the Jews of Palestine, and in vogue among them at the time of Christ. It had practically held sway there for at least over a century and a half. Prophetic writings and teachings had been sacredly revered for over seven centuries before Christ. Anterior to this, Mosaic laws were recognized as a religious and ethical norm. These scriptures were held by Christ in supreme esteem. In this view and under his interpretation they held the sum and essence of his teaching. They had divine value for such as sought the way of eternal life. In them was the word of God. This high estimate was adopted by Apostles and Church fathers.

All these statements may confidently be made. But they leave unanswered two important questions, each calling for extended treatment: when did the various constituents of the Old Testament gain entrance there? And what problems encumbered this process? These questions are exceedingly broad. They open up the whole debate of modern Bible study. In handling these matters the methods are mainly those of historical and literary criticism. In the historical study factors and arguments shift and change with the years. The method is mainly by comparative study of archaeology, chronology, history, and literature. Illustrations are the tablets of Tel-el-Amarna, the Moabite

BIBLE

stone, the creation tablets, the lists of Babylonian and Assyrian kings, and the records of their various campaigns. But these studies deal mostly with the contents of the Old Testament books, and not with the books themselves and the main divisions of the Old Testament viewed as literature and growing into a canonical unity.

Of the literary arguments bearing upon this question the most telling is that of parallel accounts or doublets. These repetitions show variations. These variations suggest different points of view, different authors, and a combining editor. A careful study of these literary phenomena leads into a broad field of Biblical literary criticism. The aim of this study is to trace out the various authors and times and histories of these different documents. At present the tendency in this study is strongly analytic. The accent in the investigations is laid upon the differences. These differences once well defined and fixed, the effort is to trace the origin and date of each distinct document and to explain when, and how, and why they were combined into the present form. The keynote of all this process is differences. Upon this, main arguments rest. These arguments stand strongest, when the differences amount to discords or contradictions. Many of these variations are openly apparent. Many others, so it is claimed, are glossed over by ancient editorial efforts after harmony. These modulations should be removed, and the original contrast stand clear. Hence much textual emendation. It tends to sharpen contrasts. By this process each separate document is brought to a strict unison with itself, and a sharp dissonance with its companion in the doublet. Each fragment has a marked individuality, stripped as much as possible of inner manifoldness. One document, one idea; or if several ideas, then as few and similar as may be. These separate and diverse documents thus reduced and defined are then arranged, as to origin and editorship, in an evolutionary scheme of history. The simple and crude are dated early. The complex and refined are dated late. Thus the origin and evolution of the Old Testament is explained by the method of literary criticism at present characteristically in vogue. Elements aiding this process are direct historical testimony to a document's existence, the argument from silence, literary style, fixed literary forms, ethical, and religious views. A fundamental postulate is an evolutionary view of history. A dominant impulse is to trace phenomena to a natural source.

The outcome of this method is to affirm late origins for most Hebrew literature. A simple arrangement may be found in Driver, 'Introduction to Literature of Old Testament'. In general, the existence of any volume of recognized sacred Mosaic law prior to 622 B.C. is denied; or of anything but Deuteronomy prior to 444 B.C.; or of any recognized prophetic canon prior to 444 B.C.; or of any canonical volume including the books usually clustered with Psalms and Proverbs, prior to 165 B.C. In particular, the Psalms are largely denied to David, and dated instead after the exile. Daniel is dated at 164 B.C. Still it is largely concluded that teachings of Moses and of Prophets, as also certain Psalms, were held in honor earlier.

To this method and its conclusions are opposed considerations like the following: Its

scheme of doublets is overworked; its conjectures are too numerous; its textual emendations too frequent and ungrounded; its standards are too uncertain; its documents are so stripped and reduced as to become void of life. By no such rigid rules does man express himself. Silence is no proof. The ancient editors are too mythical and their backs too heavily loaded, and that with most unlikely wares. Too much is made of documents. Not enough is made of men. History is fuller and more manifold everywhere than this method allows. Divine interventions, incitements, instructions, overrulings, and Theophanies are treated with too scanty respect. Evolutionary views do away too easily with the manhood of early men. Biblical history and conditions are not so primitive by long millenniums as this method seems to presume. In particular the lofty value of the Psalms demands more attention. By the negative critical method they stand unexplained. Vastly more lay back of the 8th century than this method presents. Too much is loaded upon Ezra and in the period of the Maccabees. Far too many direct Biblical affirmations have to be reversed.

Thus scholars conflict touching the genesis of the Old Testament. In this far-reaching debate the following evidence and events are of most importance to hold in view. The allusions within the Old Testament to the existence of sacred books, such as Ex. 24:4, 7; 34:27; 40:20; Deut. 31:26; Josh. 24:26; I Sam. 10:25; Isa. 8:16; Jer. 30:1; 36:1, 28; II Kings 22:8; Dan. 9:2; Neh. 8-9; the Praise of the Famous Men in Sirach (chapters 44-50); the prologue to Sirach; the opinions of Philo; the estimate and usage of the New Testament, Josephus, *contra Apion* 1, 8; II Esdras 14:44-46, the work of the Council of Jamnia; and the evidence of the Mishna; also all light obtainable in the great field of comparative studies, specially from Babylonian archaeology. In broad outline, the main problems are to find out what sacred literature existed prior to 165 B.C.; then prior to 444 B.C.; then prior to 623 B.C.; then prior to 750 B.C., the period of the great written prophecies; then in the Davidic era; then at the time of Moses; then to find the origin of the various fragments in the unique section Gen. 1-11. Touching most of these problems, definite information is at present nowhere in reach. The precise connection of the Biblical creation and flood accounts with Babylonian material, the contents of the sacred books in the Mosaic era, the range of sacred literature in Isaiah's time, the list of Davidic Psalms, the literature held sacred in the exile, the scope of the books handled by Ezra, the outside outline of Sirach's sources, or of his grandson's allusions, a sharp definition of the rise and influence of apocryphal writings, a satisfying explanation of the varying or the final order of Old Testament books, the meaning of the Septuagint divergences, and the actual evaluation of apocryphal literature by our New Testament writers—these all are questions fairly open to debate. Knowledge is incomplete.

VI. *Canon of Old Testament.*—Study of the genesis of the Old Testament leads naturally into an examination of its development into a fixed and closed canon. While it seems proper and safe to say that our present Protestant Old Testament canon is identical with that accepted

BIBLE

by the Jews of Palestine in and before the time of Christ, there are numerous evidences that even among Palestinian Jews several canonical questions were under debate for a century or two after Christ.

To begin with the latest Jewish testimony and work backward toward origins, first mention has to be made of a full statement from the Babylonian Talmud. This passage is traced to Rabbi Judah the Holy, head of the school of Tiberias in the 2d century. He is said to have collected the Mishna. In this statement all the parts of the Old Testament, as we have it, are named with a definite statement as to authors. "Moses wrote his book and the section concerning Balaam and Job. Joshua wrote his book and those eight verses in the Law. Samuel wrote his book and the book of Judges and Ruth. David wrote the book of Psalms 'at the hand of' 10 old men, to-wit: Melchizedek, Abraham, Moses, Heman, Jeduthun, Asaph, and the three sons of Korah. Jeremiah wrote his book and the book of Kings and Lamentations. Hezekiah and his friends wrote Isaiah, Proverbs, Song of Songs, Ecclesiastes. The men of the great synagogue wrote Ezekiel, the Twelve, Daniel, and the little book of Esther. Ezra wrote his book and the genealogies which we read in the book of Chronicles." This statement seems, considering its probable source, to indicate a fixed canon. But discussions of certain Old Testament books occurred considerably later. These concerned Proverbs, Song of Songs, Ecclesiastes. Proverbs was charged with internal contradictions. All three were deemed uncanonical by some, because they contained parables. Repeatedly, debates rose as to whether Ecclesiastes and Esther were fully canonical, that is, whether they "defiled the hands." The regulations about the feast of Purim in Esther seemed to contradict the Pentateuch. While for Ezekiel, its strange legislation in the closing section made real trouble. At a much later time Jonah made occasion for special remark, because of its neglect of Israel and attention to Gentiles. For full information upon this stage of Jewish thought, see Wildeboer, 'The Origin of the Canon of the Old Testament,' pp. 56-75. As to the meaning of these facts men judge differently. Some say these books were all held canonical; it was simply a discussion of vexing problems which they contained. Others say these debates imply that these books were not as yet within the canon.

Another date and event to be marked is a council at Jamnia, in western Palestine, about 90 A.D. Then problems were raised about certain books, in general the Kethubim, but in particular, Ecclesiastes and Song of Songs. They were all declared holy, that is, canonical.

About this time is to be dated II Esdras 14:44-46. Here is an apocalyptic story of Ezra's miraculous dictation of 94 sacred books, 24 of which were to be promulgated as the public Jewish canon. This story must have found its motive partly in the fact that at about 90 A.D. the Jewish canon held 24 books.

Josephus also belongs to about this date. He has left in *contra Apionem*, 1:8, a painstaking list and estimate of the Jewish canon of his time. He makes the number of the books 22. He reckons five to Moses, 13 to the prophets, and four containing hymns to God and maxims for human life. He does not name

the several books. It is therefore uncertain whether his list agrees with ours. Some think he left out Ecclesiastes and Song of Songs. Some think he joined Lamentations to Jeremiah, and Ruth to Judges. In any case his statement is most notable. He boasts of their limited number, of their antiquity and their cordial acceptance. He closes the canon with the period of Artaxerxes. Later books are not deemed worthy of like faith. No one has dared to increase or diminish their volume. They are cordially deemed God's oracle, and held as rules for life and death. All these arguments are made with deliberation for purposes of defense. They form a weighty evidence.

Philo, who lived somewhat earlier, an Alexandrian Jew, seems to have held just the list accepted by us as strictly canonical and of authority. His reverence for the Mosaic writings is most evident. He quotes nothing from the Apocrypha. This is noteworthy. He also leaves wholly unmentioned 17 of our canonical books.

In the prologue to Sirach is a reference three times over to "the Law," "the Prophets" (Prophecies), and the "Others" (other books, remaining writings) with suggestions, also repeated, of their unique value for culture and wisdom, and of their fulness and significance. This was written about 130 B.C. It seems to betoken a complete threefold canonical collection. It occurs in a brief statement explaining the work of his grandfather which he is about to publish and commend to the men of his time.

This work of Sirach, the grandfather of the foregoing, was written about 180 B.C. It is permeated with the very substance of our Old Testament. Its clearest light on the problem of the Old Testament canon is in chapters 44-50. Here he sings the praise of famous men. He selects 24 names, besides the Judges and the 12 Minor Prophets, from Enoch to Nehemiah, and sings their praise. To this he appends a song to Simon of his own time. And at the end he names himself. In these eulogies Sirach holds scripture in high esteem. He seems to especially honor the Law. But it becomes specially difficult to say anything about his views of Old Testament canon. He seems to attribute to Simon and even to himself a respect all but equal to that accorded to the prophets. Plainly all the law and all the prophets and all the historical books were before him. Some of the Hagiographa fail of mention. There was manifestly, at 180 B.C., an Old Testament canon of recognized sacred standing, all but commensurate with ours of to-day.

The situation in the time of Ezra is far from clear. The passages to examine are Nehemiah 8-9; Ezra 7:6, 10, 12, 25, 9:10. From these passages it stands apparent that Ezra was a ready scholar in the law of God; that he had prosecuted his study during the exile; that some literature held sacred by him had been long in hand; that much of our Mosaic law was recognized as Mosaic by him and by the assembly described in Nehemiah 8-9; that religion, morals and life were constructed upon this Mosaic foundation. But just the extent of the Mosaic writings, just their antiquity, and just what other literature may have supplemented them is far from explicitly said.

BIBLE

Daniel 9:2 alludes to books that must have been prophecies, alluding in particular to Jeremiah. In his prayer he alludes to laws, ordinances, a covenant, the deliverance from Egypt, the warnings of the prophets, mentioning Moses. But no canonical list can be constructed here.

To this may be added citations from earlier portions of Scripture, indicating the existence of sacred records. None of these citations are certainly definitive of canonical limits at any period. But it may not improperly be said that the multitudinous allusions throughout Old Testament scripture to early divine revelations and leadership all, if only taken at their face value, go to show that records of these early events were always at hand and held validly sacred depositories of the Word of God. But historically, the inner content and the outside outline of this Old Testament canon comes into sight and shape for the first time in the words of Sirach about 180 B.C. Then it stood practically as it stands with us to-day. Later queryings were limited and substantially insignificant. And such debates as did arise were due to the extreme reverence of the Jews for the Mosaic Law, to their peculiar interpretation of that law, and to their jealousy to have all their sacred writings stand in fullest harmony therewith. For statements of their extravagant respect for the law see Weber, 'Die Lehren des Talmuds,' pp. 1-60, and Wildeboer, pp. 94 —.

From among Church fathers three witnesses call for special mention here. Melito, Bishop of Sardis, about 170, went into Palestine expressly to get the Jewish view of the number and order of the books of the Old Testament. His finding is given in Eus. Hist. Eccl. iv. 26. His order is peculiar. He omits Esther entirely. Nehemiah and Lamentations are not named, but probably they are included, the one with Ezra, the other with Jeremiah. Origen's canon is also found in Eus. Hist. Eccl. vi. 26. This list omits the Twelve Prophets, probably some mistake. It includes Esther. It adds the letter of Baruch. Origen died 254 A.D. Jerome died 420 A.D. In his preface to his translation to Kings he gives the Hebrew canonical list, 22 books. This is a very precise and carefully detailed statement. It is found in full in Wildeboer, pp. 80-84. He gives Jewish views, names the Apocrypha separately, and lists the canon as we have it to-day. He speaks elsewhere of Jewish queryings about Ecclesiastes. The Nestorian Christians reject Esther, Chronicles, Ezra, and Nehemiah, but accept Sirach. But in the main always, and from Jerome onward the Christian Church accepted the Jewish canon as finally fixed by them 200 A.D., and as we have it to-day. Still, through the influence of the Septuagint, the Vulgate, and Augustine, the Roman Catholic Church has retained also the Apocrypha.

VII Text of Old Testament—Our earliest information names tables of stone. Upon these were written the commandments. Deuteronomy was a roll, when found in the temple. Jeremiah's writings were a roll. The script was originally the old square characters seen on the Moabite stone, and in the Samaritan copy of the law. Later, no one knows when, the Aramaic characters were used. This is the script used to-day in all Hebrew Bibles. In the Maccabean

period, the Syrian oppressors destroyed most of the Jewish sacred literature. Judas Maccabeus collected them all again. Possibly it was he who introduced the new writing. See II Maccabees 2:14. When the Jews fixed and adopted an official Old Testament text is unknown. Most date the act at the beginning of our 2d century, at the councils of Jamnia, 90 and 118 A.D. Tradition says they used three manuscripts found at Jerusalem. These early texts were wanting in vowels and separation of words. The scribes, 200-500 B.C., made numerous changes in the way of corrections, definition, pronunciation, and other improvements, including divisions and arrangements for liturgical use. These scribes were followed by students who were called Massoretes who simply guarded and perpetuated the work of the scribes. From this has come our present, so-called Massoretic text. These Massoretes added vowel points, completing their work in the 7th century in Babylon, and in the 8th century in Palestine. This work is perpetuated in the text of Ben Asher of the 10th century. Upon this all later western manuscripts have been based. In these latest years some efforts have been made to reconstruct the ancient texts, notably by Baer and Delitzsch. For samples of just what may be done, consult Kautzsch, 'Die Heilige Schrift des Alten Testaments,' in the textual emendations collected in the appendix.

VIII. Manuscripts of the Old Testament.—Jews have been extremely jealous of the purity of their manuscripts. Rules calling for minutest accuracy are laid down in the Talmud. See Kenyon, 'Our Bible and the Ancient Manuscripts,' p. 34. This carefulness secures truthful copies. Hence recent manuscripts are prized quite as highly as those most ancient. Indeed the old manuscripts are religiously destroyed, so that they may escape desecration. Hence we have no Hebrew manuscripts earlier than about the 10th century, and even these are few and incomplete.

IX Versions of the Old Testament.—The Samaritan Pentateuch, though not a version, should be mentioned. If its original form could be produced, it would give us a Hebrew text, perhaps dating from the days of Neh. 13:23-30. But we have no manuscripts older than the 10th century.

The Septuagint version was made from Hebrew into Greek, somewhere between 300 and 130 B.C. This version was extended to embrace the Apocrypha. Other Greek translations were made: one by Aquila about 150 A.D.; one by Theodotian a little later; and one by Symmachus about 200 A.D. Origen tried to restore the Hebrew text about 240 A.D. Only fragments of this work survive. The same effort is made about 300 A.D. by three other men, Eusebius, Lucian, and Hesychius. The best evidence for restoring to us the original Septuagint is contained in the three famous manuscripts: the Sinaitic, the Alexandrian, and the Vatican, dating from the 4th and 5th centuries A.D. The best printed edition of the Septuagint now extant is that by Swete. A much larger edition is now in progress at Cambridge.

Other versions of the Old Testament dating from the early centuries are the Syriac, 2d or 3d century A.D.; the Coptic, 3d century A.D.; and the Latin, chief being Jerome's Vulgate, about 400 A.D.

BIBLE

X. *Genesis of the New Testament.*—In the earliest days of the New Testament Church their sacred book of authority was the Old Testament. The apostles of Christ were continually referring to these Hebrew writings and expounding them. But in this process they were also always preaching that Jesus was the Christ. The Old Testament Messiah and the Nazarene were one. This was their dominant theme. As an outcome their message was full of statements about Jesus. Indeed, this was the centre and the sum of their preaching. Thus their proclamation put into being a body of teaching about the person and words and deeds of Jesus Christ. In this Christic life the Old Testament found its fulfillment. Hence there came to stand alongside the Old Testament material another body of truth, having equal sacred value, namely, the report and record of the life of Jesus Christ. Moreover, at the same time, and in the same process there came into form and shape the substance and sacred authority of an Apostolic message. And so, gradually, and in a vital way, as an outcome of the growing life of the New Church, a set of writings called Apostolic came to be acknowledged as a New Testament Canon and to be set alongside the Old Testament as having equal authority and worth. This process took time, and had its stages. Its separate steps we are not able to trace. It stood complete in the canons of the 3d Council of Carthage 399 A.D. From that date onward the New Testament stands in its full integrity as a canonical body of sacred literature. So all Christendom has agreed.

To trace this historical uprising of our New Testament is well nigh the most urgent task of modern Christian scholarship. Something needs to be said about this Christ left no writings. This seems undoubtedly sure. It seems almost equally sure that the first New Testament writings were the natural outgrowth of the Apostolic work. In this process Paul holds the pre-eminent place. His writings, while mostly born of special needs, held an enduring value. They engrossed his authoritative message. As such they were cherished, and formed a nucleus of sacred New Testament literature. In some vital connection with this growing life and work under Apostolic lead, there grew up our gospels. Just how, and just when this most important work was done no one surely knows. Efforts at the reconstruction of this process are making everywhere and all the time. But the procedure is almost entirely theoretic.

Certain facts stand clear. The gospel of John stands in a place by itself. Its outline of Christ's life, its choice and treatment of material, and its central themes are all widely and strangely unlike the main features of the other gospels. Luke also has a striking individuality, containing a surprising quantity of material found nowhere else, though for all that agreeing strikingly and in essential respects with Matthew and Mark. Matthew and Mark are plainly very closely akin. They are commonly felt to have arisen in some way expressive of close fellowship of aim, form, sources, and time. Touching the origin of all four explicit inner witness is lacking. The simple fact of their actual rise into a position of supreme authority and respect, whatever may have been the method or means, gives every presupposition in favor

of the genuineness of all four as authorized reports of Jesus' life. Thus much needs saying by itself.

Certain traditions about their origin have figured very influentially. Eusebius, about 300, reports from Papias, about 140, that a "presbyter" used to say that "Peter used to give his instructions according to what was required, but not as giving an orderly exposition of the Lord's words." These "Mark, having become an interpreter of Peter, wrote down accurately, etc." Immediately in the same context Eusebius quotes Papias as saying of Matthew that "he wrote the oracles in the Hebrew dialect, and each one interpreted them as he was able." Of Luke we can gather no helpful traditions; we have to gather all we know from references in his gospel, in Acts and in Paul's writings. While the mention of the gospel of John opens a world of sharpest scholarly divergence and debate.

Now to outline briefly leading theories: The gospels are conjectured to have originated something thus: First, in the first three gospels there are striking signs of broad similarity; their general synopsis of the main outline of Christ's public life is the same; they use many phrases in common; they expand and condense at the same points; such facts intimate that very definite and potent influences operated in common upon all three. This solicits explanation. But they also strikingly differ, these differences are commanding and broad. Luke has much unique material; Matthew distributes his material into coherent masses; Mark seems simpler, truer, strikingly independent. These variations also call for explanation. These resemblances and divergences are being traced with minutest carefulness. The aim is to find the facts as to their origin. Which gospel was first; which was next; what were their sources respectively and in common; how are Matthew and Mark, Matthew and Luke, Mark and Luke, related; did any one depend on any other, or upon the other two; did some fourth account, now lost, lie back of these; what was the Hebrew gospel, etc.? These are the leading questions which students are trying to answer. A view widely held at present supposes that Mark preserves to us a document which came to his hand from some source unknown to us; that Matthew preserves to us another document called the Logia; that these two were combined by Matthew in forming his gospel; that Luke also used the Logia, combining it with his own new material. This is the now widely known "two-document" theory. The main efforts here are to define the original full pure form of each of these two documents. Here positions vary manifoldly. Another view urges vigorously that no written documents lay behind any of our gospels. What preceded our written gospels was an era of very careful catechetical instruction. Out of this memorized and crystallized material grew our gospels. This method seems to find a measure of illustration in the oral discourses of the book of Acts. For a historical review of this study see Sanday, 'Expositor' 1891, 'A Survey of the Synoptic Question.'

The study of the origin of the gospel of John is getting to be a science by itself. It has hardly a single thing in common with the debate over the first three gospels. Look at

the fourth gospel carefully. Its progress of events, its relation to Judæa and Jerusalem, its report of the great debates, its miracles, its discourses, its style, its ideas, its very words are all peculiarly its own. Two questions have come to the front. Are its narratives authentic history? Was it written by the son of Zebedee? But other problems are also urgent: When and where and how was it written? What is the sum and drift of its internal evidence? What has been its external history? Has its order of chapters or paragraphs been disturbed? How is it related to the epistles of John, and to the Apocalypse? To list and classify the views that have been held, saying nothing of the literature, would be impossible here. See special article on Gospel of John. Suffice it to say that among scholars, as they strive to give some rational account of these matters, there has been a strong tendency to discount the historical value of this gospel, and to deny its full authorship to the apostle John. But the great heart of Christendom has always felt that it found and felt in the Gospel of John the very presence of its very Lord, as discerned and described by his most profound and intimate disciple. The prime question has always been in plain view. Did the only begotten Son of God become incarnate for our salvation? This is the Johannine question. Upon this prime problem hangs every other. Once state in full and in brief the entire sum and nature, the whole scope and purport of its words, as they stand; note its unity, its homogeneity and its profundity; survey the sweep of its thought; look into its religious purity, its ethical absoluteness, its transparent clarity; sense its overwhelming momentum; observe its entire fluidity, the energy of the whole pouring full from every part; being watchful all the while to see that these impressive qualities, all and single, lie throbbing and shining in this gospel wholly and only because of the clear and full presence of the Christ, whom some author, with an all-absorbing devotion, has endeavored to unveil — and one must conclude and exclaim that here is no human invention, no poetic embodiment of any earth-born type of thought; but rather the declaration and disclosure, by an anointed and enraptured eyewitness, of his own full and immediate vision of the heavenly glory of Jesus Christ, the only begotten and incarnate Son of God. At any rate it can be boldly said that a discussion of the origin of the Gospel of John, to say nothing of the other three gospels, deals with the inmost essence of the subject of this essay.

Some special mention of the book of Acts is also needful in any statement of the genesis of New Testament writings. Here is an authority of the first rank and importance. It is our sole reliable record of the earlier days of the Christian Church. It defines and presents the actual process of the transition from the life and time of Christ to the Apostolic Age. Its references to geography, and archaeology and politics and civil administration and customs, all presented with singular minuteness, at the same time expose it to the sharpest tests of historical criticism and establish its singularly full trustworthiness. Written without much doubt by Luke, a personal friend and companion of Paul, and a man of painstaking

accuracy, it offers from chapter 20:5 on, and also in chapter 16, the testimony of an eyewitness; from chapter 12 on, a record of first-hand knowledge; and in its first 12 chapters a compilation from sources which he was in a peculiarly good position to obtain and inspect with the aid of first rate authorities. But problems beset the book. The leading of these concern the day of Pentecost; the relation of the speaking with tongues in Acts 2 to that in I Corinthians 14; the relation of chapter 15 to Galatians 1 and 2; the sources of the book; the authorship; the text; and the speeches. In particular, certain scholars impugn chapters 1-7, and all records of miraculous events. But in the main these are matters that lie beyond the range of precise historical outside proof. Hence theories may continue to abound. But sober views must contend that here is a faithful reflection of the primitive Christian days, from the hand of an alert and competent historian who wrought under the immediate influence and presence of apostolic men, in the very midst and upon the very ground of the scenes which he reports.

One other section demands mention in this study of the genesis of the New Testament — the Apocalypse. The surface aspect of this book is bewildering. Its historical allusions are the puzzle of the ages. Interpretations are a crazy medley. But statements of another nature may also be made. This book belongs to a class. It is one of many. In fact it marks a world current. Taken altogether, the outpour of Apocalyptic literature is a phenomenon of noteworthy persistence. It springs up repeatedly in Old Testament life. A striking instance is Daniel. It wells up frequently in the speech of Christ. Many would deny all such ideas to him. But this is rash and violent in the extreme. His conscious connection with Daniel cannot be impugned. His own apocalyptic utterances must be allowed. Then the teachings and experiences of Paul cannot be erased. Thus much touching form. But once one penetrates beneath the form, and confronts the inner message of every Biblical apocalypse, — he is a rash assailant who would assume to undo its word. This is pre-eminently true of the Apocalypse of John. It is a book of impregnable strength. Its central theme is the world struggle between the true God and his blasphemous counterfeit for the worshipping allegiance of mankind. This is the one inmost and uppermost errand and office of the book. Specially in chapters 12-22 the evolution and description of this conflict stand forth in stupendous strength. The true God, the living God, the creator God, the spirit God, sole Lawgiver, Judge and Saviour of angels and men, holy, infinite and pure; the suffering and glorified Christ, mighty, gracious, and true; with their innumerable, worshipping, devoted human and angelic hosts, on the one side — the Dragon and Beast and pampered Queen, full of blasphemy, treachery, cruelty, and lust; with their hosts of devotees to every sordid lust, on the other side, representing all the personnel, good and bad of a teeming universe, surge and strive unto issues of eternal life and eternal death amid the scenes of this mysterious book. It is a volume of life in which the awful struggles within the realms of religion and ethics attain their ultimate culmination. It fixes for-

BIBLE

ever the issue toward which all the teachings of the Bible tend. Here, as nowhere else, the solemn undertone of the entire volume sounds forth in full expression. Here the full majesty of God, the full enormity of sin, the full anguish of guilt, the full felicity of grace stand clear. Here the inner structure and substance of true morals and religion are shown and seen to be imperishable. However mysterious and confusing the outer guise of this incomparable book, whatever historical allusions its various enigmas may really intend, whoever its author, whencesoever its sources, and whatever the motive stirring its writer's mind, its inner teaching, simple and sublime, concordant, inclusive, and pure, forms the crown and marks the consummation of all for which the Bible most distinctly stands. Its nature befits its place. It well corresponds to the mysteries and enduring strength that mark the opening chapters of the book standing at the beginning of the Biblical list. It is a book of issues. A study of its genesis leads back into a deep and far-seeing study of the real inner meaning of all the volume which it concludes. Thus much needs saying about its inner value.

Critical study of the origin of this book has in recent years taken a new turn. This study deals distinctly with its apocalyptic features, and its historical intimations. It has pursued two marked courses, one that of literary, the other that of historical criticism. The latter is at present paramount, and bids fair to hold the first place. It consists in an effort to trace, through a study of the world's apocalyptic literature, the actual historical genius of the forms found in this work ascribed to John. This work is as yet but fairly begun. Till it is done efforts at final estimates are vain. The nature and field and status of this study may be seen in Bousset, 'The Antichrist Legend.'

XI. *Canon of the New Testament*—This study seeks to trace the actual historical acceptance of the New Testament writings by the Church as a recognized body of sacred literature, worthy to stand alongside the Old Testament. One has to begin with 140 A.D. Witness as to this date is very meagre and indefinite. The data are from the epistle of Clement to the Corinthians, the II Epistle of Ignatius the Epistle of Polycarp, the Didache, the Epistle of Barnabas, the Shepherd of Hermas, the writings of Justin Martyr. Some of these testimonies date later than 140 A.D. by a few years. But they stand so near that date as to form fair testimony as to that era. The evidence is mostly by way of allusions to sayings found in our New Testament writings; and not in the form of direct citation or mention. But these allusions and references are sufficiently numerous and suggestive to support quite firmly the supposition, which otherwise seems most natural, that our New Testament writings were at that date widely known and honored. In a few cases the exact words of our gospels were used by these early writers, as a quotation from the Lord's Prayer, and from his words in Gethsemane. In some cases New Testament writings are mentioned, as Paul's epistles, I Corinthians and Philipians. One writer refers to the words of Christ in Matthew 22:14 as Scripture. In particular the work of Papias is important. His words shed light on the period prior to 140 A.D. He explicitly attests "writ-

ings" as of Apostolic value, one from Peter through Mark, and one from Matthew. He also seems to have known of other writings from the hands of Peter and John. See Eus. 'Hist. Eccl.' iii. 39. The words of Justin are of the greatest value, though still indeterminate. He alludes repeatedly to 'Memoirs of the Apostles.' He uses the word "Gospels." He traces these writings to the "Apostles and those who followed them." He seems certainly to have had in hand our first three gospels. Some important elements of his work seem almost as surely traceable to the Gospel of John. He alludes to Paul's epistles as standard. He also names John's Apocalypse. Marcion also apparently knew and used Luke, and accepted 10 epistles of Paul, namely, Galatians, I and II Corinthians, Romans, I and II Thessalonians, Colossians, Philemon, Philipians, Laodiceans. Statements like the above are as definite as can be made about our New Testament prior to 150 A.D. The fullest testimony within the Church is from Justin Martyr. He bears witness that a New Testament canon was in vogue in his day, having fully equal validity with the Old Testament. How far back can this condition be supposed to date; and how many books were included? Zahn says that our four gospels and the 13 Pauline epistles were widely circulated as collections at the latest about 125 A.D. Harnack declares this unsupported by historical evidence.

200 A.D. In stating in general the situation of the New Testament canon at this date the chief witnesses are Tatian, Irenæus, Clement of Alexandria, Tertullian, Hippolytus, the Muratori canon. These sources make many features stand clear. Tatian prepared from our four gospels his Diatessaron. Irenæus attests all our New Testament books except Philemon, II Peter, Jude, specially emphasizing the value of the four gospels. He calls these New Testament writings the "pillar and ground of the faith." He combines them with the Old Testament as upborne by the same spirit. Clement of Alexandria distinctly attests the same writings as sacred writings, including II Peter, Jude, and Hebrews. Tertullian made abundant use of our New Testament writings as holy writings, excepting that he is silent about II Peter and II and III John, and sets Hebrews, I Peter, and Jude into a second rank. The Muratori Fragment makes a sharp definition of canonical books. It includes the four Gospels, Acts, 13 epistles of Paul, I and II John, Jude; and omits Hebrews, I and II Peter, III John. At this period, as in the earlier era, certain writings, not now held canonical, notably Barnabas, Shepherd of Hermas, and Apocalypse of Peter, seem to have stood near to sacred Scripture in Christian respect. For this era the Syriac version yields peculiar material. It accepts Hebrews, but omits II Peter, II and III John, Jude, and Revelation. In brief, at 200 A.D. our four Gospels, Acts, 13 epistles of Paul were established universally in supreme respect as sacred Scripture with the old Testament.

200 to 323 A.D. In this era two names call for mention. Origen, who died 254 A.D., has left quite outspoken statements. The most valuable are in Eus. H. E. VI. 25. He gives the four gospels sharp definition as unique and canonical. He exalts the works of Paul without numbering his books. He declares I Peter

BIBLE

"acknowledged," and II Peter as in circulation. He includes Revelation and I John, mentioning II and III John as not held "genuine by all." He discusses at length on Hebrews, honoring its contents, but wondering about its authorship. In other passages he includes Acts as by Luke, and credits 13 epistles to Paul, and uses James and Jude. One striking feature is Origen's distinctions. He speaks of some books as "not spoken against," of others as not held "genuine" by all, of another as "acknowledged," a term which he also applies to all the "Apostolic writings."

Eusebius in H. E. III. 25 gives a classified list, aiming to summarize the views of the whole Christian period to his day. He gives the four gospels, Acts, 14 epistles of Paul, I John, I Peter, and Revelation. These he called "acknowledged." He then names James, Jude, II Peter, II and III John as "disputed." He names next "Acts of Paul," Shepherd, Revelation of Peter, Barnabas, Teachings of the Apostles as "spurious." Here is notable testimony. It is representative. It is discriminating. It contributes toward conclusions. It shows a universal, undoubted canonical standard. It shows cautious study and practice. It shows that precisely our present canon was held at that time, and we cannot be sure how early or how far his testimony reaches. And it shows that writings now finally rejected were then rejected. This is one of the chief landmarks in the history of the New Testament canon.

323 to 397 A.D. Constantine gave standing to the Christian Church. He revered and disseminated sacred Scripture. Conflicts with heretics made outlines precise. The canon, accordingly, became clear and took final form. Doubts vanish. The word "canon" comes into vogue. The Synod of Laodicea, about 360 A.D., has been said to have left a list, in its 60th canon. At any rate it belongs in this period. It gives the present Protestant canon for Old Testament and New Testament, only omitting Revelation. This omission was characteristic of the Eastern Church at this time. In the West, Hilary and Rufinus held to this canon. Augustine and Jerome also fixed upon our present list, though recognizing that some books were challenged. The formal concluding steps were taken authoritatively for the Western Church at the third Council of Carthage, 397 A.D. In 495 A.D. Bishop Gelasius I of Rome put forth a synodical verdict as a decree adopting the list and fixing the order of the New Testament canon as we have it to-day. In 691 A.D. this was adopted for East and West by a universal council.

XII. Text of the New Testament.—Up to the time of Constantine the fortune of New Testament Scriptures was precarious. We know too little about it all. But Christians were largely poor, often persecuted, sadly scattered and altogether unable to solidify and maintain in permanent form all the elements and instruments of their life. We have no original New Testament manuscripts. We have no copies from the first three centuries. When Constantine accepted Christianity, among other things, he ordered Eusebius to prepare 50 copies of the Scriptures for the churches of Constantinople alone. From that century manuscripts begin to appear, two being preserved to our day. Two more date from the 5th century. From

the 6th century 27 documents have come to our time. From the 7th century 8 small fragments. These authorities and many more of later days restore to us our New Testament text. Aid is also rendered by versions. Chief of these are the Syriac and the Latin. Further aid comes from the Church fathers. The text which lay underneath our authorized English version was based on very inadequate knowledge and study of textual authorities. In later years this study has become a noble science. In most recent years its prosecution has taken a turn of phenomenal meaning. Scholars are trying to group textual authorities. In this impressive undertaking Westcott and Hort are leaders. They seek to classify sources into families, and so to be able to estimate manuscript values. In this process one group is called "Syrian," including a great number of authorities, but all alike being of low value. Another group is the "Western." Of this the leading manuscript is D, Codex Bezae, so-called. This group is remarkable for freedom, specially for adding otherwise unknown material. Another group is the "Alexandrian." This group is of minor weight. The fourth group is called "Neutral." This is believed to represent most nearly the original New Testament. Its leading authority is B, the Codex Vaticanus, so-called. This is the oldest and weightiest manuscript we have.

This raises the whole question of the relative worth of manuscripts. It may be surely expected that this problem is by no means solved. It is little more than opened.

Independent workers are challenging the positions of Westcott and Hort. But after all is said and done, our New Testament text is mainly assured. "The great bulk of the words of the New Testament stand out above all discriminative processes of criticism, because they are free from variation, and need only to be transcribed. . . . The words in our opinion still subject to doubt can hardly amount to more than a thousandth part of the whole New Testament. See Westcott and Hort, 'Principles of Textual Criticism'."

Manuscripts of the New Testament.—Four manuscripts deserve emphatic mention, as they are prime sources for both Old Testament and New Testament. Codex Alexandrinus, named A, dates probably from the 5th century. It contained originally the whole Bible in Greek, also the two epistles of Clement. At present it is mutilated. Parts of Genesis, I Kings, and Psalms, most of Matthew, parts of John and II Corinthians are lost. It is now in the British Museum. It came from Constantinople to England in 1627. As an authority it rates lower than the two next named.

Codex Vaticanus. B.—This dates from the 4th century and contained originally the whole Greek Bible. This is deemed by many the oldest and most precious manuscript known. It is in the Vatican library at Rome, since 1450 A.D. In its present state it lacks portions of Genesis, II Kings, Psalms, Hebrews, the Catholic epistles, and all of Revelation. Its text had predominant influence with Westcott and Hort and with the revisers of our English Bible.

Codex Ephraemi. C.—This dates from the 5th century. Originally it contained the whole Greek Bible. It is now in the National Library

BIBLE

in Paris. Early in the 16th century it was brought to Italy from the East. It was taken to Paris by Catherine de Medici. At present it is a palimpsest and only a fragment, having only a small part of the Old Testament and barely more than half of the New Testament. It is of great value.

Codex Sinaiticus, Aleph.—This dates from the 4th century. It now exists in two parts: one, of 43 leaves, in the Court Library in Leipzig; the rest in the Imperial Library in St. Petersburg. It originally contained the whole Greek Bible. But now the Old Testament is in fragments. The New Testament is complete. This is the manuscript that was found by Tischendorf under such thrilling experiences in the monastery of St. Catherine at Mount Sinai. It is of priceless value as a witness to the New Testament text.

Codex Bezae, D.—This manuscript originated perhaps in the south of France in the 6th century. It is now in the University Library at Cambridge, being the direct gift of Beza in 1581. It contains the Bible in two languages, Greek and Latin. The relation of these two texts to each other is a very curious and unsolved problem. As a witness it has to be used with great caution. Its New Testament text contains only the Gospels and Acts and a few verses from the Catholic epistles. Its most striking and puzzling feature is its strange omissions, and still stranger quite extensive additions.

The above named are the leading manuscripts. These are all written in large letters called uncials. Of these there are over 100. Many more, considerably over 2,000, are written in smaller letters and in a more running style, and so are called cursives. For further statements consult the *Variorum Bible*.

XIII. Versions of the New Testament.—Of these the Syriac would naturally date early. Until toward the middle of the last century all supposed the so-called Peshitto, or common version, to be the one and only Syriac translation of Scripture. In 1842 manuscripts came to view suggesting another and perhaps earlier version. Since that time there has been much debate over the problem of two versions in Syriac. Of late new light has come, and again from Mount Sinai. Here in 1892 two ladies found a palimpsest of a Syriac version which may possibly be older than either. This debate is destined to continue for some time. Of these versions the Peshitto is the great standard version of the Syriac Church. It has been current and in general use from the 4th century. We know of 177 manuscripts, gathered from the Nitrian Desert in Egypt, and now in the British Museum. This version does not include II Peter, II and III John, Jude, and Revelation. Other Syriac versions have been made.

Egyptian Versions.—These must have begun to originate by 300 A.D. At present five are known. The Memphitic represents lower Egypt, where the dominant dialect was at home. Here alone are complete copies of the New Testament found. Over a hundred manuscripts have been examined, all of late date, the oldest from 1173. Its text is surprisingly good. The Thebaic version was current in upper Egypt. It probably originated somewhat later than the Memphitic. It exists only in fragments, though

many of them are very old manuscripts, some dating possibly into the 4th century.

Armenian Version.—This originated in the 5th century. It was made from mixed texts, Greek and Syriac. Its earliest manuscript dates from the 8th century.

Gothic Version.—This was made by Ulfilas in the 4th century directly from the Greek. Now it is in fragments.

Old Latin Version.—This was made, perhaps, in Africa about 150 A.D. Scholars trace rival translations and classify them as African, European, and Italian. These were supplanted by the Vulgate. Textual study of this early version is of peculiar interest, disclosing, as it does, a very free treatment as characteristic of that time, and containing what is called the "Western" text.

Vulgate.—This is a work undertaken by Jerome at the order of Pope Damasus in 382. At first he merely revised the Old Latin, working on the Gospels. Then he developed the rest of the New Testament. His Old Testament work was much later and more thorough-going. Manuscripts of the Vulgate exist everywhere in Europe. The best is the Codex Amiatinus. The text of this version has been in very bad condition, and it is very difficult to restore. The work is in progress. This is the standard Bible of Latin and Roman Catholic Christendom everywhere.

XIV. History of the Bible as a Whole.—Jerome's influence through his Vulgate version and through separation of the Apocrypha from the canon was far-reaching. In the 16th century the Roman Catholic and Protestant Churches took different courses. The Roman Catholic Church in its Council of Trent in 1545, adopted the Old Testament Apocrypha as an integral part of the Old Testament canon. The Lutheran party, after some indecision, settled down by usage upon the pure and full Biblical canon as held by us to-day, though during the process there was free discussion of the value of the parts that we have found under dispute. The same holds true of the Swiss or Reformed party. Through them, and by way of the Westminster Confession of Faith, we have received our present body of sacred Scripture.

Previous to this the Bible had made its way to England. About 670 A.D. Cædmon made a paraphrase in verse of the Bible narrative in Anglo-Saxon. Before 800 Aldhelm had translated the Psalms into English. In 735 Bede finished, with his life, a version of John. King Alfred also did some work of this kind. But of these nothing surely remains. Numerous other translations of parts of the Bible were made later. Of some of them manuscripts remain.

Wycliffe's first translation dates from 1380-2. This was a composite work. Soon after his death this was revised; and this revised Wycliffite Bible became the current version. About 170 copies are known. This is the first known complete English Bible. Though of untold value, it was not a scholarly work, being based upon a poor Latin translation.

In the 15th century printing appeared, November 1454. In the same century, and at about the same time the Turks took Constantinople and scattered scholars out of the East, with their learning and treasures, over Europe. Out of this revival of learning and printing came mighty sequels for the Bible. Translations and

BIBLE

copies now could multiply. In England several versions need mention.

In 1525 Tyndale completed in Hamburg his translation of the New Testament. Despite strenuous efforts to destroy it, copies multiplied. But most of them have perished. This version, variously revised, is the influence lying most potently underneath the present King James Bible, and through it our English tongue has gained and retained not a little of its peculiar charm.

Other translations are Coverdale's, undertaken at the request of Cromwell, dedicated to Henry VIII, covering the whole Bible, and published in 1536; Matthew's, really a completion of Tyndale's, made under favor of the king, finished in 1537; the Great Bible, a grand, authorized edition of Matthew's, under Cromwell's patronage, by the hand of Coverdale, published in 1539 and set up in every church; the Genevan Bible, prepared in Geneva by English refugees under the influence of Calvin and Beza and published in 1560; the Bishop's Bible, prepared under the patronage of Elizabeth and the editorship of the Archbishop of Canterbury for the English Church, and printed in 1568; and the Roman Catholic or Douay Bible made from the Latin Vulgate for the Roman Catholic Church, and published 1582 and 1609. Of these the Genevan Bible had the widest influences; it was the first entire English Bible to adopt the division of chapters into verses.

Authorized Version.—This work was produced under the patronage of King James I. at the suggestion of the Church leaders. About 50 scholars were engaged in the work, arranged in six groups. They used Beza's Greek Testament of 1589 for the New Testament. The Bishop's Bible formed the English basis, though the Genevan and Douay versions had much influence. Through the Bishop's Bible Tyndale still made his power felt. This version was published in 1611 to become the standard form of sacred Scripture for over 200 years for the entire English race. Its influence upon literature and life can never be told.

Revised Version.—Increase of knowledge of Biblical lore since 1611 made a revision imperative. This work was proposed officially by the Established Church of England in its Convocation of 1870. Rules were laid down governing the translation, enjoining use of best text, faithfulness to the original meaning, and as few alterations as possible. Two companies were formed, of 27 members each, selected from various denominations. These were supplemented by a body of American scholars, whose results, when not adopted by the English body, were incorporated in an appendix. The work began in 1870. The New Testament appeared in 1881, the Old Testament in 1884. The changes from the version of 1611, while very numerous (Dr. Kenyon records that the Greek New Testament of 1881 differs from that of 1611 in 5,788 readings, of which about one quarter are a notable change) are prevailing only in matters of minor moment.

American Version.—In 1901 the surviving members of the American committee, appointed by the English committee in 1870, published an edition of the English Bible in which the opinions of the American members of the revision hold first place. In this edition there are several notable improvements in the way of faithfulness and modernness and facility in

use. Chief among these is the new list of marginal readings.

German Versions.—Luther's is the standard, though many translations appeared before his. He translated directly from the Greek and Hebrew, putting out 10 editions during his life. In 1863 the Evangelical Church Diet set afoot a revision of Luther's Bible. Specially to be mentioned for scholarly value are Weizsacker's German translation of the New Testament; and the translation of the Old Testament conducted by Kautzsch and completed in 1894.

French Versions.—The chief early version is that by Olivetan in 1535. In 1588 a revision was made at the suggestion of Calvin and under the lead of Beza. This has been the standard French Bible. A new translation by Segond 1874-9 is now most widely used.

The standard Dutch Bible, called the States Bible, is a translation authorized in 1624 by the States-General of Holland, and completed in 1637.

To-day there exist at least 108 translations of the entire Scriptures. If partial translations are added, the total will nearly reach 500. In this work the past century has been a phenomenal era. It has seen the Bible put into the possession of 1,200,000,000 of people. This is pre-eminently the work of Protestant Christianity. During this past century 80 Bible Societies have come into being, with a multitude of auxiliaries. Of these the leading one, the British and Foreign Bible Society, issues annually nearly 4,000,000 copies.

XV. Influence of the Bible.—The persistence of the Bible and its unexampled dissemination command some remark. Its age-long and world-wide promulgation must contribute to extend and fortify its power. But its own original, creative force alone can explain its amazing diffusion and vitality. It proves itself pre-eminently the Book of Life. The sacred Scriptures of no other religion or faith can ever begin to parallel it for the number and value of its manuscripts, the number of its versions, the number of its publishing houses, and the number of its copies actually sold. As literature it is wholly unique. The stamp of its style has fixed the taste of the leading nations of our time. And its manifoldness is quite as wonderful as its excellence. It embodies history and oratory, dialogue and drama, philosophy and poetry, giving every essential form of human literary utterance. It has laws, tragedies, annals, parables, prayers, satires. It contains the epic, the lyric, the ode, the chorus, the oracle, the riddle, the chant, the liturgy, the refrain, the acrostic, the apostrophe, the proverb, the epistle, the philippic.

But it is not the form, pleasing and refining as it is, that holds the secret of the Bible's power. It is always the message that transmits force. The Bible figures always as the Word of God. It engrosses and addresses character. Its moral energies are the sources of its strength. It reveals and declares God. It announces law. It portrays the judge. It stirs up conscience to a final verdict upon human life. It summons the human will. Its heroes are prophets. Its great victors are princes in the moral realm. Its central figure is Jesus Christ. Its typical explorers are apostles. Its closing book is an apocalypse. Its outlook is eternity. These things create and sustain its matchless

BIBLE

style; and these explain and feed its undying life. It has to do with the being and majesty of a holy God, and with the inmost character and uttermost destiny of immortal man. Hence all its excellence and strength.

Bibliography.—H. W. Hoare, 'The Evolution of the English Bible'; J. T. Sutherland, 'The Bible' (with list of books and critical estimates); J. Robertson and others, 'Book by Book'; Farrar, 'History of Interpretation'; Farrar, 'The Messages of the Books'; Moulton, 'The Literary Study of the Bible'; F. G. Kenyon, 'Our Bible and the Ancient Manuscripts'; F. G. Kenyon, 'Handbook to the Textual Criticisms of the New Testament'; M. R. Vincent, 'History of Textual Criticism'; E. Kautzsch, 'History of the Literature of the Old Testament'; S. R. Driver, 'Introduction to the Literature of the Old Testament'; H. S. Nash, 'History of the Higher Criticism of the New Testament'; Fr Buhl, 'Canon and Text of the Old Testament'; G. Wildeboer, 'The Origin of the Canon of the Old Testament'; Westcott, 'General Survey of the History of the Canon of the New Testament'; J. A. McClymont, 'The New Testament and Its Writers'; J. Smith, 'The Integrity of Scripture'; Hug, 'Einleitung in die Schriften des Neuen Testaments' (4th ed 1847); Tregelles, 'An Account of the Printed Text of the Greek New Testament' (1854); O'Callaghan, 'A List of Editions of the Holy Scriptures and Parts Thereof Printed in America previous to 1860' (1861); Ferrar, 'A Collection of Four Important Manuscripts of the Gospels' (ed Abbott 1877); 'Vom Lesen der Heiligen Schrift, nach Johann von Neercassel' (1846); Carpzov, 'Critica Sacra' (1728); Kortholt, 'Die Varii Sanctæ Scripturæ Editionibus' (1668); Hagemann, 'Nachrichten von den Fumemsten Uebersetzungen' (1750); Ebert, 'Allgemeines Bibliographisches Lexikon' (1820-30); Kaulen, 'Geschichte der Vulgata' (1869); id., 'Handbuch zur Vulgata' (1870); id., 'Einleitung in die Heilige Schrift Alten und Neuen Testaments' (4th ed. 1898-9); Wetzler und Welte's 'Kirchenlexikon' (1882-1903). See BIBLE, HARMONY OF, WITH SCIENCE; BIBLE, POLYCHROME; BIBLE STATISTICS; BIBLICAL CRITICISM, CANON; CODEX; CODEX ARGENTEUS; CODEX SINAITICUS; CODEX VATICANUS; EXEGESIS; GOSPELS; HIGHER CRITICISM, THE; NEW TESTAMENT CHRONOLOGY; NEW TESTAMENT THEOLOGY; OLD TESTAMENT, THE; SEPTUAGINT; also the articles on the various books of the Bible.

C. S. BEARDSLEE,

Professor Hartford Theological Seminary.

Bible, Harmony of the, with Science. The history of science in its connections with the Bible is full of these conflicts between the scientific and theological classes. Both parties have participated in them, as assailants and defenders. Sometimes scientists, after misleading the divine into some supposed scientific interpretation of Scripture, have charged back upon him their own exploded errors, and sometimes divines, after attacking some true theory of the scientists as hostile to Scripture, have gladly accepted it as among their best defenses of the faith.

Astronomy and the Bible.—The first of the seeming conflicts was between astronomy and the Bible. The Psalmist David, who was not a

scientist, had poetically depicted the starry heavens as a spangled canopy wondrously wrought by the divine hand. But the astronomers in later times devised what is known as the theory of Ptolemy, according to which the heavens were composed of vast crystal spheres, one within another, having the sun, moon, and stars attached to them as they revolved around the earth, which was conceived of as a flat, circular plane, immovably fixed at the centre of the system. The divines of the day, docilely accepting this crude mechanism of the scientists, proceeded to celebrate the divine power, wisdom, and goodness which it displayed in producing the wonderful vicissitudes of day and night and summer and winter. Their logic was correct enough in form, but needed to be reinforced with better science. The better science at length came, not indeed from a professed scientist, but from a faithful priest of the Church, Nicholas Copernicus, who modestly broached as a working hypothesis, what is now known as the Copernican theory of the solar system. Galileo, however, who could equal Huxley in sarcasm and invective, published in his scientific journal called 'The Siderial Messenger,' such proofs of the Copernican theory as provoked a bitter controversy with the Church authorities and led to his pretended recantation. It is difficult for us now, with our advanced knowledge, to understand what a radical change was coming into men's opinions. Not only was the solid earth sent spinning through space like a cannon ball, but the entire orthodox conception of heaven and hell was literally revolutionized. The Inferno of Dante, with its descending ranks of lost spirits and demons, could not be contained within such a revolving globe, and his Paradiso, with the saints and angels worshipping the Blessed Virgin and Holy Trinity, vanished from such a receding firmament like sunset clouds. And when Bruno came with his daring speculations concerning other inhabited worlds our little planet seemed too utterly insignificant to be made the scene of a divine incarnation, redemption, and judgment. Every essential article of the faith appeared to be imperiled. It is no wonder that free thinking men of science fared badly in such a conflict with the Roman Inquisition. Galileo was imprisoned as a heretic, and Bruno was burned at the stake as an atheist and blasphemer. But what has been the issue of the conflict? Scarcely a trace of it remains. Gradually the new astronomy has been accepted, not only as true in itself, but as far more accordant with Scripture than the old astronomy of the Hebrew or Greek. Instead of a star spangled tent or an illuminated dome of glass, it has opened an unbounded universe for the illustration of the divine perfections and revealed doctrines. Does astronomy tell us of an immensity of space, with regions beyond regions which we cannot even conceive? The Bible also teaches us that Jehovah inhabiteth eternity, and the heaven of heavens cannot contain Him. Does astronomy tell us of countless orbs, moving with tremendous forces, in fixed orbits, under immutable laws? The Bible also teaches us that He hath ordained the heavens and established in them His power and faithfulness. Does astronomy tell us of wonderful adaptations of planet to sun, with changing zones, and climates, and

BIBLE

seasons? The Bible also teaches us that wisdom was with Him when he prepared the heavens, the sun and moon and stars for signs and for seasons, and that He hath garnished them by His spirit. Does astronomy hint to us of a variety of habitable worlds, with a corresponding variety of intelligent races? The Bible also teaches us of the heavens as the abode of angels and archangels and of a heavenly Father and His house of many mansions. Does astronomy tell us that our earth is akin to other orbs in mechanical and chemical constitution, and suggest that we may be some day knit together with them by ethereal vibrations in psychical sympathy? The Bible also teaches us that the angels desire to look into the mysteries of human redemption, that its manifold wisdom is now made known to principalities and powers in all heavenly places, and that there is rejoicing among them when one sinner on earth repenteth. Let it be observed, I am not now saying that the Bible teaches astronomy, but simply that its teaching is in harmony with astronomy.

Geology and the Bible.—The next seeming conflict was between geology and the Bible. It is certain that Moses did not speak as a man of science in his dramatic vision of the creation, when he described the heavens and the earth, land, sea and sky, plants, animals and man, as produced by divine commands in six working days, ending in a seventh day of rest. The early geologists, however, accepted this sublime vision as a scientific cosmogony, and like-minded divines followed them, magnifying such creative miracles as the formation of the terraqueous globe in 24 hours, the arrangement of its seasons and climates between a single sunrise and sunset, and the marshaling of its vegetable and animal kingdoms by divine fiat from Monday morning until Saturday night in the autumn of the year 4004 B.C. Here again the argument, absurd as it now seems, lacked scientific content rather than logical form. It is within living memory what a shock ensued when that scientific content was furnished, and it was discovered that the earth is of indefinite antiquity, that its continents have emerged from its oceans through long ages of subsidence, and that successive dynasties of plants and animals have flourished and decayed, leaving only a few fossil remains in its crust. The very doctrines of the creation and the Sabbath itself seemed directly assailed, and the defense of them was fierce and desperate. The geologists were not persecuted like Galileo and Bruno; but the most extraordinary make-shifts were devised to evade their conclusions. It was intrepidly declared that the Almighty created the earth in a stratified form with all its fossils, to serve as a trial of our faith. It was ingeniously surmised that the whole prehistoric geology was a chapter omitted in Genesis as not relevant to the purpose of the narrative. It was even fancied that the six days' works were a special miraculous creation in Eastern Asia to fit up a Paradise for the temptation and fall of man. When at length the vast geological periods could no longer be denied, they were forced into correspondence with the Mosaic days, con-

ceived as days of Jehovah, with whom a thousand years are as one day; and elaborate schemes of reconciliation were proposed by such distinguished geologists as Hugh Miller, Dawson, Dana, and Guyot, with which some less distinguished geologists have since made themselves merry. Nevertheless, we are already emerging from these heated discussions with reassured faith. As astronomy has opened unbounded regions of space for the illustration of the divine immensity, omnipotence, immutability and omniscience, so geology has recalled unlimited periods of time for unfolding the divine power, wisdom, and goodness with cumulative richness and fulness. And as astronomy has shed new light upon the revealed doctrine of the heavens and the angels, so geology is confirming the revealed doctrine of an orderly creation and a sabbatical calendar. Though the dramatic days of Genesis be measured in hours or in ages, though the time element be excluded from them altogether, though they be treated as ideal rather than actual, they will still appear as coincident acts of creation and phases of evolution, founded perhaps in the periodicities of nature and expressed in the Fourth Commandment. On comparing them we have, first, a formless waste or the nebulous chaos; second, the earth as divided from the firmament or the planet as parted from the solar nebula; third, the seas and the dry land bringing forth grass and herb, or the terraqueous globe with its photosphere and commencing verdure; fourth, the appearing sun, moon, and stars for signs and seasons, or the mature planet, in the solar system, with its zones and climates; fifth, the swarming of the great fishes and winged fowl, or the production of sea monsters and mammoth reptiles; sixth, the earth bringing forth beasts each after its kind, and the making of man in the image of God, or the evolution of the higher animal and human species, seventh, the divine day of rest, or the tranquil historic period. The correspondence, it will be seen, is at least logical, even if not chronological. On the one hand, geology clearly indicates that there have been successive periods of energetic evolution ending in a period of repose and order; and on the other hand, the Bible declares that in six days God created the heavens and the earth, and rested from his works on the seventh day. Geology also tells us of a primitive watery globe, whose glaciers and inundations have ceased since the appearance of man; and the Bible also, after the deluge, speaks of a covenant between Jehovah and the earth for man's sake, that summer and winter, and seedtime and harvest shall not cease. Geology still hints of interior fires which might at any time burst forth in general conflagration; and the Bible still warns latter day scoffers of a day when the earth and all the works that are therein shall be burned up. You may say that this teaching of the Bible is religious rather than scientific; that is not the point—whatever it be, it is in harmony with geology.

Anthropology and the Bible.—We are still in the midst of a seeming conflict between anthropology and the Bible. In the vision of creation man appears as made in the

BIBLE

image of God, with dominion over all inferior nature. Then follows an allegorical picture of the first man, Adam, as formed out of the ground, inspired with a living soul, and placed among the beasts of the field, and the fowls of the air, which had also been formed out of the ground and brought to him to receive their names. The first woman, Eve, his wife, is depicted as fashioned out of one of his ribs while he was in a trance, and the pair were placed in a garden to till it, with liberty to eat of every tree but the tree of knowledge of good and evil. They were tempted to disobedience by the subtlety of Satan in the form of a serpent, and so fell from their state of innocence, entailing the curse of labor, sorrow, and death upon the whole of mankind. It would seem impossible to find any strict anthropological science in this instructive parable; and yet until recently it has been so treated by both scientists and divines, who have held that man was molded by the divine hand as a lifeless clay image among living plants and animals; that he was endowed with psychical faculties and God-like qualities in a few minutes or hours, and that the man Adam was the sole progenitor of all the savage and civilized races of Asia, Europe, Africa, and America. But scientists are now urging some very different theories of human origin and development. We are told by palæontologists and ethnologists that man was but the product of the whole evolution of organic nature; that his remote ancestor was a man-like animal or anthropoid ape; that next came a succession of pre-Adamite races, of which the Hottentot, the Patagonian, and the Esquimau may be the survivors; that there have also been co-Adamite races as indigenous in other continents than Asia as the plants and animals with which they are there found associated; that all civilized races, including the Adamite, or Caucasian, have risen from savagery, with improving implements and arts, through long epochs of stone, of bronze, and of iron, and have a prospect of indefinite improvement in the future. In spite of the theological prejudice and some instinctive repugnance, we have begun to entertain these theories, and may already provide, if need be, for their acceptance. As astronomy and geology have afforded new illustration of the physical attributes of Jehovah, so anthropology is unfolding His intellectual and moral attributes, in the structure of both body and soul, and may in like manner be adjusted to the revealed doctrines of human depravity and the divine image. The essential truths in the allegorical story of Eden will stand unimpaired, whether we view man's sinfulness as a primitive lapse or as a present condition; whether we regard his ideal Godlikeness as impressed upon him thousands of years ago or as still in process of development. If anthropologists shall prove that primeval man, physically considered, was evolved from pre-Adamite and anthropoid races as a half-animal savage in a state of nature; that he slowly developed psychical powers and religious beliefs; that while many breeds of men remain debased and deteriorated the Caucasian breed, both Hebrew and Christian, has been steadily advancing in knowledge, virtue, and religion, and that the perfected

man of the future, with growing arts and sciences, may yet transform the globe and even bring it into connection with other worlds and races. If the anthropologists, I say, shall prove all these things, the Bible will teach, in correlation with them, that the first man Adam was of the earth, earthy, placed in a fruitful garden, associated with the animals, but with dominion over them; that God breathed into him a living soul and made him after His own image; that as in Adam all die, so in Christ shall all be made alive, and as we have borne the image of the earthly, so also shall we bear the image of the heavenly, and that the man of prophecy, as renewed after the image of Christ, the Lord from heaven, shall yet inhabit the new heaven and the new earth, wherein dwelleth righteousness. And still, too, will such teaching of the Bible, though unscientific, be found to be in harmony with such facts of anthropology.

Archæology and the Bible.—And now we are entering a seeming conflict between archæology and the Bible. The historical books, with no show of historiographic art, record the fortunes of the peculiar people of Israel as descended from the patriarchs, Abraham, Isaac, and Jacob, as worshipping Jehovah in distinction from the false gods of the heathen around them, as returning even from their captivities in Egypt and Babylon with a fresh reassertion of their own creed and ritual, and as ever looking forward to the Messiah, Christ, in whom their whole religion was at length absorbed and fulfilled. Philosophical historians, as well as learned commentators, have hitherto accepted these simple annals as accurate and trustworthy. Of late, however, some discredit has been cast upon them by certain archæologists, who claim that the inscriptions on the tablets unearthed at Babylon bear suspicious resemblances and affinities with Biblical stories of creation and paradise. The American Professor Hilprecht, with the true scientific spirit, declines to make such invidious comparisons, and declares that the Babylonian polytheism stands in contrast with the Hebrew monotheism. But the German Professor Delitsch hastily infers from them that the Hebrew monotheism was no better than Babylonian polytheism, and jumps across the following centuries to the conclusion that our Saviour himself thus deprecated the Jewish religion. Meanwhile, the German Emperor William, after admonishing the learned antiquarian professor to stick to the Babylonian tablets, without drawing theological inferences, proceeds to give his own somewhat conservative views of the theology of the Old and the New Testaments. It is a very interesting controversy. But suppose we should concede, for the sake of argument, all that the theological archæologists are trying to prove,—grant that the inspired vision of creation and the divine allegory of Eden may have some crude counterparts in the corresponding myths and legends of Babel—is it quite inconceivable that both have descended, the one in a pure and the other in a corrupted form, from the same primeval revelation in the dim period before the flood? Are not the Hebrew Scriptures one continual

BIBLE—BIBLE STATISTICS

protest against the religious errors of surrounding nations, and have they not at the same time infinitely surpassed them in the religious truths which they have unfolded? Is it any more incredible that Judaism should have been developed out of, or in spite of, preceding religions than that Christianity should have been developed out of or in spite of Judaism, both of them under that wonderful Providence which has educated the chosen races of mankind? Moreover, it has distinctly taught that both Judaism and Christianity, after their isolation and pupilage, were destined to universal prevalence; that in Abraham all the families of the earth would be blessed, and Christ himself be revealed as the desire of the nations. And the Gospel, therefore, was proclaimed among the Gentiles as well as among the Jews. St. Paul, too, the Apostle to the Gentiles, when preaching to the Athenians, insisted upon the consensus of Christianity with their religion in those great theistic beliefs which were taught by their own poets and philosophers, and which are common to all mankind. And, as Christianity, clad in civilization, is now going forth among the religions of the world reclaiming their truths and rejecting their errors, she is simply fulfilling her mission as the one absolute and universal religion—the faithful saying, and worthy of all acceptance, that Christ came into the world to save sinners.

I do not forget how much the question is complicated by the views of a radical school of the higher critics who maintain, on literary grounds, that the Old Testament Scriptures themselves betray that mythical and legendary origin which some archæologists would ascribe to them. Many of the conclusions of this school are based upon unverified conjecture and continual asseveration. But it may be well to accept them hypothetically, in order to state the whole problem of opinion. Assume then, if you like, that the books of the Pentateuch or Hexateuch were not written by Moses, but were a sort of mosaic of pre-existing documents written by unknown scribes and collected by unknown redactors or editors, as we now possess them. Assume also that the Biblical stories of creation and paradise in their literary form are anthropomorphic, dramatic, allegorical, and unhistorical. Assume still further that in these respects they bear some external resemblance to the creation-myths and paradise-legends of other Eastern peoples. Prove all this, if possible; and yet you will not have destroyed the incontestable fact that these ancient writings contain an objective revelation from God to man which is infinitely superior in kind and degree to any supposed revelations in the religions of Babylon, Nineveh, Assyria, Egypt, Greece, and Rome; and which even as to literary form surpasses any other sacred books, ancient or modern. Nor will you have lessened the evidence which the Bible thus affords of growing harmony with the very sciences of archæology and philology which are now arrayed against it.

In this article I have sketched in a popular manner those physical sciences which have seemed to be in conflict with revealed religion, because such sciences just now are most popular in their impression and most likely to

disturb existing faith in the inspiration and authority of the Holy Scriptures, and because they are the most advanced sciences. The argument might be carried up into the higher sciences of psychology, sociology, and the science of comparative religion, but such sciences, as yet, are not so mature nor in so apparent conflict with the Scriptures. It will be seen that the argument is strongest where science is most clear and full. It is also cumulative, and already, I trust, warrants the belief that when science shall have reached the utmost goal of its development it will still be, as it always has been, in harmony with the Bible.

CHARLES WOODRUFF SHIELDS,
Professor Princeton University.

Bible, The Polychrome. A new translation of the Scriptures from a revised text, by eminent biblical scholars of Europe and America; Professor Paul Haupt of Johns Hopkins University, editor, with the assistance in America of Dr. Horace Howard Furness. The special scheme of this great work is its use of color backgrounds upon which to print the various passages by different writers which have been made up into one work, as Isaiah or the Psalms. It is not based on any doubt of inspiration, but on the general conviction of biblical scholars that only good can come from making perfectly clear to the public the full results of modern critical research.

Bible Statistics, an interesting compilation, said to be the fruits of three years' labor by the indefatigable Dr. Horne, and given by him in his introduction to the study of the Scriptures. The basis is an old English Bible of the King James version.

Old Testament—Number of books, 39; chapters, 929; verses, 23,214; words, 593,493; letters, 2,728,100.

New Testament—Number of books, 27; chapters, 260; verses, 7,959; words, 181,253; letters, 838,380.

The Bible—Total number of books, 66; chapters, 1,189; verses, 31,173; words, 773,746; letters, 3,566,480.

Apocrypha—Number of books, 14; chapters, 184; verses, 6,031; words, 125,185.

Old Testament—The middle book of the Old Testament is Proverbs. The middle chapter is Job xxix. The middle verse is 2 Chronicles xx, between verses 17 and 18. The shortest book is Obadiah. The shortest verse is 1 Chron i 25. The word "and" occurs 35,543 times. Ezra vii. 21 contains all the letters of our alphabet. The word "Selah" occurs 73 times and only in the poetical books. 2 Kings xix. and Isaiah xxxvii. are alike. The Book of Esther does not contain the words God or Lord. The last two verses of 2 Chronicles and the opening verses of the Book of Ezra are alike. Ezra ii. and Nehemiah vii. are alike. There are nearly 30 books mentioned, but not found in the Bible, consisting of civil records and other ancient writings now nearly all lost. About 26 of these are alluded to in the Old Testament.

New Testament.—The middle book is 2 Thessalonians. The middle chapter is between Romans xiii. and xiv. The middle verse is Acts xvii. 17. The smallest book

BIBLES — BIBLIOGRAPHY

is 2 John. The smallest verse is John xi. 35. The word "and" occurs 10,684 times. The name Jesus occurs nearly 700 times in the Gospels and Acts, and in the Epistles less than 70 times. The name Christ alone occurs about 60 times in the Gospels and Acts, and about 240 times in the Epistles and Revelation. The term Jesus Christ occurs 5 times in the Gospels.

The Bible.—The middle book is Micah. The middle (and smallest) chapter is Psalm cxvii. The middle verse is Psalm cxviii: 8. The middle line is 2 Chronicles iv. 16; the largest book is that of the Psalms; the largest chapter is Psalm cxix. The word Jehovah (or Lord) occurs 6,855 times. The word "and" occurs 46,227 times. The number of authors of the Bible is 50. The Bible was not until modern times divided into chapters and verses. The division of chapters has been attributed to Lanfranc, Archbishop of Canterbury, in the reign of William I, but the real author of this division was Cardinal Hugo de Sancto-Caro, about 1236. The number of languages on earth is estimated at 3,000; the Bible or parts of it have been rendered into only about 180, or, languages and dialects together, 345. The first English translation complete of the Bible was by Wyclif in 1380. The first American edition was printed in Boston in 1752.

Bibles, The Seven, the seven principal Bibles of the world are the Koran of the Mohammedans, the Eddas of the Scandinavians, the Tripitikes of the Buddhists, the Five Kings of the Chinese, the three Vedas of the Hindus, the Zend Avesta, and the Scriptures of the Christians. The Koran is, except the Eddas, the most recent of these seven bibles and not older than the 7th century of our era. It is a compound of quotations from the Old and New Testaments, the Talmud and the Gospel of St. Barnabas. The Eddas of the Scandinavians was first published in the 14th century. The Tripitikes of the Buddhists contain sublime morals and pure aspirations, but their author lived and died in the 6th century before Christ.

The sacred writings of the Chinese are called the Five Kings, the term king meaning web of cloth or the warp that keeps the threads in their place. They contain the best sayings of the best sages on the ethico-political duties of life. These sayings cannot be traced to a period higher than the 11th century before Christ. The three Vedas are the most ancient books of the Hindus, and it is the opinion of Max Muller, Wilson, Johnson, and Whitney that they are not older than 11 centuries before Christ. The Zend Avesta of the Persians is the grandest of all these sacred books next to our Bible. Zoroaster, whose sayings it contains, was born in the 12th century before Christ.

Biblia Pauperum (Bible of the poor), the name for block books common in the Middle Ages, and consisting of a number of rude pictures of Biblical subjects with short explanatory Latin text accompanying each picture. A similar work, but more extended and with rhymed text, was the 'Speculum Humanæ Salvationis' or 'Mirror of Human Salvation'. Prior to the Reformation these

two books were much used by the preaching monks, and as such orders as the Franciscans, Carthusians, etc., were styled 'Pauperes Christi,' the first named book, so popular with them, came to be known, therefore, as the 'Biblia Pauperum'.

Biblical Criticism, the science which has for its objects (1) to decide which books are entitled to a place in the Scripture canon, and (2) to bring the text of these canonical books to the utmost possible degree of purity. In prosecuting the first of these aims, the Biblical critic must not be confounded with the Christian apologist; the function of the former is a strictly judicial one, while the office of the latter is that of an advocate. One important subject of investigation is as to what Old Testament books were recognized as divine by the ancient Jewish Church or Synagogue; as also what New Testament books were at once and universally welcomed by the early Christian Church, and what others were for a time partially rejected, though they ultimately found acceptance everywhere. In seeking to purify the text, the Biblical critic must do much toilsome work in the collation of codices or manuscripts. He does not put the whole of these on one level and admit whatever reading has a majority of manuscripts in its favor; but attempts to test the value of each one apart, forming an hypothesis if he can as to when, where, and from whom it emanated, and from what other manuscripts it was copied at first, or in technical language, to what recension it belonged. See **BIBLE**

Bibliography, a term signifying the knowledge of books, in reference to the subjects discussed in them, their different degrees of rarity, curiosity, reputed and real value, the materials of which they are composed, and the rank they ought to hold in the classification of a library. It is therefore divided into two branches, the first of which has reference to the contents of books, and may be called, for want of a better phrase, *intellectual* bibliography; the second treating of their external character, the history of particular copies, etc., may be termed *material* bibliography. The object of the first branch is to give information regarding the most valuable books in every department of study by means of catalogues.

Bibliography has been, and still is, cultivated most successfully in France. This is owing partly to the riches of the great and daily increasing public libraries, liberally thrown open to the use of the public, partly to the large number of fine private collections. Brunet's well-known 'Manuel du Libraire' was the first important work which contained, in an alphabetical form, a list of the most valuable and costly books of all literatures; Barbier's 'Dictionnaire des Ouvrages Anonymes,' the first systematic and satisfactory treatise on this subject; Renouard's 'Catalogue d'un Amateur,' the first, and for a long time the best guide of the French collectors; the 'Bibliographie de la France,' the first work which showed how the yearly accumulation of literary works can be recorded in the most authentic manner. No less valuable are the works of Peginot, Petit Radel, Renouard on the Aldines, and various others. Among more recent French works may

BIBLIOGRAPHY

be cited 'Bibliographie de la France,' a periodical publication commenced in Paris in 1810. H. Bossange, 'Ma Bibliothèque Française' (1855), gives a list of standard editions of the best French authors. I. M. Quérard, 'La France Littéraire ou Dictionnaire Bibliographique,' an account of the literature of the 18th and 19th centuries (10 vols. 1827-39); Quérard, 'La Littérature Française Contemporaine' (1827-49); Brunet's 'Manuel du Libraire' (new edition, 6 vols. 1860-5); E. Hatin, 'Bibliographie de la Presse Périodique Française' (1 vol. 1866); Lorenz, 'Catalogue Général de la Librairie Française depuis 1840,' giving French publications from 1840 to 1899.

In England, although it contains many rich public and private collections, bibliography has not been so successfully cultivated as in France. The most extensive catalogues of books of which it can boast are those of the Bodleian Library, the British Museum, the Advocates' Library, Edinburgh, the Harleian Library (compiled partly by Dr Johnson), etc. Catalogues compiled on a scientific system, by which the reader is assisted in his researches after books on a particular subject, are not numerous in English, but we may mention Sonnenschein's 'The Best Books' (1891), and 'Guide to Contemporary Literature' (1895), presenting classified lists of about 100,000 works. The most splendid catalogue perhaps ever published is that of the Earl of Spencer's Library, compiled by Dibdin, in four large volumes, with numerous engravings. Among English bibliographical works are the 'Typographical Antiquities' of Ames, Herbert, and Dibdin, Adam Clarke's 'Bibliographical Dictionary and Miscellany' (1803-6). Dibdin's 'Introduction to the Knowledge of Rare and Valuable Editions of the Classics' (1827, 2 vols.); Brydges' 'Censura Literaria' (1805), and 'British Bibliographer' (1818); Beloe's 'Anecdotes of Literature' (1807), Savage's 'Librarian' (1808); Dibdin's 'Bibliographical Decameron' (1817); and 'Tour in France and Germany' (1821); Horne's 'Introduction to the Study of Bibliography' (1814); Robert Watt's 'Bibliotheca Britannica' (1824, 4 vols 4to), a work of stupendous labor and great utility; Joseph W. Moss' 'Manual of Classical Bibliography' (1825); Darling's 'Cyclopaedia Bibliographica' (chiefly theological literature, 1854); 'A Bibliographical and Critical Account of the Rarest Books in the English Language,' by J. Payne Collier (1865); Lowndes' 'Bibliographer's Manual,' edited by H. G. Bohn (1869, 6 vols.); S. A. Allibone's 'Critical Dictionary of English Literature and British and American Authors' (Philadelphia 1859-71, 3 vols, and 2 of Supplement 1891); Halkett and Laing's 'Dictionary of the Anonymous and Pseudonymous Literature of Great Britain' (1882-8, 4 vols.); Sampson Low's 'English Catalogue of Books,' which in a series of successive volumes catalogues the British books published from 1835 onward to the present time.

American literature has already given rise to quite an extensive series of bibliographical works on both sides of the Atlantic. Among these are: 'Bibliographical Catalogue of Books, etc., in the Indian Tongues of the United States' (1849); Duyckinck, 'Cyclopaedia of American Literature' (1856); Ternaux-Compans, 'Bibliothèque Américaine' (Paris 1837); Trübner, 'Bibliographical Guide to American Literature' (Lon-

don 1856); and 'General American Catalogue' of Leypoldt and Jones (1880, with continuations); 'The Publisher's Trade List Annual'; 'Monthly Cumulative Index'; 'American Book Prices Current.'

The learned Germans, little assisted by public and almost entirely destitute of private collections, consulting only the real wants of the science, have actively endeavored to promote it. Ersch is the founder of German bibliography. He gave it a truly scientific character by his extensive work, 'Allgemeines Repertorium der Literatur' ('Universal Repertory of Literature' 1793-1807), and by his 'Handbuch der Deutschen Literatur' ('Manual of German Literature'). German bibliography is particularly rich in the literature of separate sciences; and the bibliography of the Greek and Latin literature, as well as the branch which treats of ancient editions, was founded by the Germans. The first attempt, in Germany, to prepare a universal bibliographical work was made by Ebert. The following are valuable German bibliographical works in particular departments of science and literature: T. A. Nosselt, 'Anweisung zur Kenntniss der Besten Allgemeinen Bucher in der Theologie' (4th ed 1800), and the continuation of it by Simon (1813); C. F. Burdach, 'Literatur der Heilwissenschaft' (1810); W. Gf. Ploucquet, 'Literatura Medica' (1808, 4 vols.); T. G. Meusel, 'Bibliotheca Historica' (1782-1802); his 'Literatur der Statistik' (1816); G. R. Bohmer, 'Bibliotheca Scriptorum Historiae Naturalis' (1785-99, 7 vols); Alb. Haller, 'Bibliotheca Botanica' (Zurich 1771, 2 vols); 'Anatomica' (Zurich 1774, 2 vols); 'Chirurgica' (Bern 1774, 2 vols); and 'Medicinae Practicae' (Bern, 1776, et seq. 4 vols); R. Buckner, 'Bibliographisches Handbuch der Deutschen Dramatischen Literatur' (Berlin 1837); W. Engelmann, 'Bibliotheca Geographica' (2 vols 1858), a classified catalogue of all works in geography and travels published in Germany from the middle of the 14th century down to 1856, with prices, index, etc.; W. Engelmann, 'Bibliotheca Philologica' (3d ed. 1853) contains a list of Greek and Latin grammars, from 1750 to 1852; the same writer has published bibliographical works on mechanical technology, medicine, economy, veterinary art, geography, zoology, palaeontology, etc.; W. Heinsius, 'Allgemeines Bucherlexikon,' an extensive work forming (with its continuations) an alphabetical catalogue of all the books published in Germany from 1700 to 1888, with sizes, prices, and publishers' names; and Keyser's 'Vollständiges Bucherlexikon,' giving books published between 1750 and 1882.

Directions for the study of bibliography are contained in Achard's 'Cours Élémentaire de Bibliographie' (1807, 3 vols); Th. Hartwell Horne's 'Introduction to the Study of Bibliography' (1814, 2 vols); and Brunet's 'Connaissances Necessaires à un Bibliophile' (Paris 1878).

Material Bibliography, often called by way of eminence bibliography, considers books in regard to their exterior, their history, etc., and has been principally cultivated in France and England. The different branches of material bibliography may here be mentioned: the knowledge of the ancient editions (*incunabula*, or, if classical authors, *editiones principes*), some of the best works on which are G. Wfg. Panzer's 'Annales Typographici' (1793-1803, 11 vols.),

coming down to 1536; the 'Annales Typographici,' by Maittaire (Hague 1719, et seq., 11 vols. 4to), which not only contains the titles, but investigates the subjects of works. More exact descriptions of particular ancient editions are found in Serna Santander's 'Dictionn. Bibliogr. du 15ième Siècle' (Brussels 1805, 3 vols.); Fossius' 'Catalogus Codicum,' sec. 15, 'Impressor. Bibliothecæ Magliabecchianæ' (Florence 1793, 3 vols. fol.); and others. The study of rare books, on account of the vague principles on which it rests, is more difficult than is generally believed, and easily degenerates into superficial and capricious trifling. This has been more injured than promoted by I. Vogt's 'Catalogus Librorum Rariorum' (1793), and J. Jac. Bauer's 'Bibliotheca Libror. Rarior. Universalis' (1770-91, 12 vols.). We may also mention here the catalogues of the books prohibited by the Roman Catholic Church ('Indices Librorum Prohibitorum et Expurgatorum'). For the discovery of the authors of anonymous and pseudonymous works, we may use Barbier's 'Dictionnaire des Ouvrages Anonymes et Pseudonymes' (1806-9, 4 vols.), which is valuable for its accuracy (but contains only French and Latin works); Quérard's 'Dictionnaire des Ouvrages Polyonymes et Anonymes de la Littérature Française' (Paris 1854-6), and his 'Supercherries Littéraires Dévoilées' (5 vols. Paris 1845-56). We need not observe what an important source of information in the department of bibliography are literary journals. Poole's 'Index to Periodical Literature' contains references to an immense number of articles that have never been republished in books. See BIBLIOMANIA

Bibliomancy, divination performed by means of the Bible, also called *sortes biblicæ*, or *sortes sanctorum*. It consisted in taking passages at hazard, and drawing indications thence concerning things future. It was much used at the consecration of bishops. It was a practice adopted from the heathens, who drew the same kind of prognostications from the works of Homer and Virgil. In 465 the Council of Vannes condemned all who practised this art to be cast out of the communion of the Church; as did the councils of Agde and Auxerre. But in the 12th century we find it employed as a mode of detecting heretics. In the Gallican Church it was long practised in the election of bishops; children being employed, on behalf of each candidate, to draw slips of paper with texts on them, and that which was thought most favorable decided the choice. A similar mode was pursued at the installation of abbots and the reception of canons; and this custom is said to have continued in the cathedrals of Ypres, St. Omer, and Boulogne, as late as the year 1744. In the Greek Church we read of the prevalence of this custom as early as the consecration of Athanasius, on whose behalf the presiding prelate, Caracalla, archbishop of Nicomedia, opened the Gospels at the words, "For the devil and his angels" (Matt xxv. 41). The bishop of Nice first saw them, and adroitly turned over the leaf to another verse, which was instantly read aloud: "The birds of the air came and lodged in the branches thereof" (Matt. xiii. 32). But this passage appearing irrelevant to the ceremony, the first became gradually known, and the Church of Constantinople was violently agitated by the most fatal divisions during the patriarchate.

Bibliomania ("book-madness"), a word formed from the Greek, and signifying a passion for possessing rare or curious books. The true bibliomanist is determined in the purchase of books less by the value of their contents than by certain accidental circumstances attending them. To be valuable in his eyes they must belong to particular classes, be made of singular materials, or have something remarkable in their history. Some books acquire the character of belonging to particular classes from treating of a particular subject; others from something peculiar in their mechanical execution (as the omission of the word "not" in the seventh commandment, which gives the Wicked Bible its name), or from the circumstance of having issued from a press of uncommon eminence, or because they once belonged to the library of an eminent man. But there are certain fashions in bibliomania, and books much sought at one time may at another be comparatively neglected. Some collections of books may possess or have possessed much intrinsic value; such as collections of the various early editions of the Bible; collections of editions of single classics (for example, those of Horace and Cicero); the editions of the Greek and Latin classics *in usum Delphini* and *cum notis variorum*; the editions of the Italian classics printed by the Academy *dell'a Crusca*; works printed by the Elzevirs and by Aldus; the classics published by Maittaire or Foulis; and the celebrated Bipont editions, with others. It perhaps was more customary in former times than at present to make collections of books which have something remarkable in their history (for example, books which have become very scarce, and such as have been prohibited), yet various scarce books are highly prized on account of nothing but their rarity, the original (1786) Kilmarnock edition of Burns' Poems, for instance. First editions may be ranked in the same class. Books distinguished for remarkable mutilations have also been eagerly sought for. Those which appeared in the infancy of typography called *incunabula*, from the Latin *cuna*, a cradle, and among them the first editions (*editiones principes*) of the ancient classics, are still in general request. An enormous price is frequently given also for splendid proof impressions of copperplate engravings, and for colored impressions, for works adorned with miniatures and illuminated initial letters; likewise for such as are printed upon vellum. Works printed upon paper of uncommon materials, or various substitutes for paper (asbestos, for instance), have been much sought after; likewise those printed upon colored paper. Other books in high esteem among bibliomanists are those which are printed on large paper, with very wide margins. In English advertisements of rare books some one is often mentioned as particularly valuable on account of its being "a tall copy." If the leaves happen to be uncut the value of the copy is much enhanced. Other works highly valued by bibliomanists are those which are printed with letters of gold or silver, or ink of singular color; for example: (1) 'Fasti Napoleonici' (Paris 1804, 4to), a copy on blue vellum paper, with golden letters; (2) 'Magna Charta' (London 1816, fol.), three copies upon purple-colored vellum, with golden letters.

Bibliomania often extends to the binding. In France the bindings of Derome, Padeloup, and

Bozerian are highly valued; in England those of Charles Lewis and Roger Payne, among 18th century binders; while Hayday, Rivière, Bedford, and Zaehnsdorf may be mentioned as among the notable craftsmen of the 19th. Even the edges of books are often adorned with fine paintings. Many devices have been adopted to give a factitious value to bindings. Jeffery, a London bookseller, had Fox's 'History of King James II.' bound in fox-skin, in allusion to the name of the author; and the famous English bibliomanist, Askew, even had a book bound in human skin. In the library of the castle of Königsberg are 20 books bound in silver (commonly called the silver library). These are richly adorned with large and beautifully engraved gold plates in the middle and on the corners. To the exterior decoration of books belongs the bordering of the pages with single or double lines, drawn with the pen (*exemplaire réglé*), commonly of red color — a custom which we find adopted in the early age of printing in the works printed by Stephens. The custom of coloring engravings has generally been dropped, except in cases where the subject particularly requires it (for instance, in works on natural history, or the costumes of different nations), because the colors conceal the delicacy of the engraving.

Other means of idle competition being almost all exhausted, a new method of gratifying the bibliomanist taste was adopted, that of enriching works by the addition of engravings,—illustrative indeed of the text of the book, but not particularly called for,—and of preparing only single copies. Books are often mutilated in this way to enrich some other book. Such "grangerized" copies have long been well known.

Among recent books valued as specimens of typography are some of those that issued from the Kelmescott Press of the late William Morris Bibliomania, which flourished first in Holland (the seat likewise of the tulipomania) toward the end of the 17th century, has prevailed in England to a much greater extent than in France, Italy, or Germany. The modern bibliomania is very different from the spirit which led to the purchase of books in the Middle Ages at prices which appear to us enormous. External decorations, it is true, were then held in high esteem; but the main reason of the great sums then paid for books was their scarcity, and the difficulty of procuring perfect copies before the invention of the art of printing. See Dibdin, 'Bibliomania' (1811); Fitzgerald, 'The Book Fancier' (1886); Lary, 'The Library' (1886); Burton, 'The Book Hunter' (1882); Field, 'The Love Affairs of a Bibliomaniac' (1896); Merryweather, 'Bibliomania of the Middle Ages' (1849, reprint, 1900).

Bibra, *bē-bra*, **Ernst von**, German scholar and writer: b. Schwebheim, Bavaria, 9 June 1806; d. Nuremberg, 5 June 1878. Being left an orphan with a large fortune at an early age, he devoted himself to physical science, and published various works that brought his name before the public. He traveled in South America, taking home with him important natural history and ethnological collections. Among his numerous works are: 'Travels in South America'; 'Memories of South America'; 'Sketches of Travel and Novels'; etc.

Bib'ulus, **Lucius Calpur'nus**, Roman politician; d. near Corcyra, Greece, 48 B.C. He was consul with Julius Cæsar in 59 B.C., which office he acquired through the influence of the aristocratic party. After his opposition to Cæsar's agrarian law had failed, he secluded himself in his house, whence he issued edicts against the measures of Cæsar. In 49 B.C. Pompey appointed him commander of the fleet in the Roman Sea. In the following year Cæsar eluded him and crossed over into Greece.

Bicanere, *bīk-à-nēr*, India, a town, capital of a principality of the same name; 240 miles west by south from Delhi. With its battlemented walls and large citadel, both flanked with round towers, and its temples, one of which rises to a great height, it presents a magnificent appearance to the traveler approaching it through the desolate tract of country in which it stands; but a nearer inspection dispels the illusion, and the greater part of the houses are found to be hovels of mud, painted red. Water is obtained from wells. Pop. (1901) 53,071.

Bicar'bonate. See CARBON.

Bicci, **Ersilio**, *bē'chē, ār-sēl'yō*, Italian poet: b. 1845. He studied in Florence, and became professor of Italian literature in the Licei Dante and Toscanelli of that city. His best composition is in the collection styled 'New Verses.'

Bice, *bīce*, the name of two colors used in painting, one blue, the other green, and both native carbonates of copper, though inferior kinds are also prepared artificially.

Bi'ceps (*biceps flexor cubiti*), the principal flexor muscle of the arm, the muscle popularly shown as evidence of muscular development. At its upper end it consists of two parts, one being attached to the coracoid process of the scapula, and the other to the margin of the glenoid fossa, about the joint. This latter, the long head, passes over the head of the humerus as a tendon and unites with the short head to form the belly of the muscle. The lower end of the biceps is inserted for the greater part to the radius, and a smaller tendinous expansion is inserted in the fascia of the forearm. The action of the biceps is to bring the forearm to the arm and to turn the inturbed hand outward.

Bicêtre, *bē-sātr*, France, a village a little to the southwest of Paris, with a famous hospital for old men in indigent circumstances, and an asylum for lunatics, together forming one vast establishment. This establishment was originally founded by Louis IX as a Carthusian monastery, became later a castle, which was demolished in 1632, after being long in a ruinous state, and was restored by Louis XIII, and destined as a retreat for infirm officers and soldiers. When Louis XIV afterward erected the great Hôtel Royal des Invalides, Bicêtre became a general hospital, and it continued as such down to the Revolution, while it contained also a house of correction for swindlers, thieves, etc. The establishment was then entirely altered and converted to its present use, the buildings being partly pulled down and replaced by new ones. The poor persons admitted must be at least 70 years of age, or incapacitated by some incurable disease from earning a livelihood. The lunatics are such as belong to the department of the Seine. They are attended to with the greatest

BICHAT — BICKERSTETH

care, and fabricate neat little articles of wood and bone, known in France by the name of "Bicêtre work." The number of beds in the institution is over 2,700.

Bichat, Marie François Xavier, bē-shār, ma-re' fran-swa ksāv-ē-ā, French physician. b. Thourrette, department of Jura, 14 Nov. 1771; d. 22 July 1802. His father, a physician, early initiated him into the study of medicine, which the young Bichat prosecuted at Lyons and Paris, where he studied under the direction of Desault (q.v.), who treated him as a son. On the latter's death, Bichat superintended the publication of his surgical works, and in 1791 began to lecture upon anatomy in connection with experimental physiology and surgery. From this period, amidst the pressing calls of an extensive practice, he employed himself in preparing those works which spread his reputation through Europe and America, and which had the most beneficial influence upon medical science generally. In 1800 appeared his 'Treatise on the Membranes,' which passed through numerous editions, and immediately after publication was translated into almost all European languages, and 'Researches Concerning Life and Death,' followed, the next year, by his 'General Anatomy' (4 vols 8vo)—a complete code of anatomy, physiology, and medicine, which was translated into English by Dr. G. Hayward, and published in 3 vols. 8vo. In 1800 he was appointed physician of the Hôtel-Dieu, in Paris, and with the energy characteristic of true genius began his labors in pathological anatomy. In a single winter he opened no less than 600 bodies. He had likewise conceived the plan of a great work upon pathology and therapeutics; and immediately upon commencing his duties as physician to the Hôtel-Dieu he began his researches in therapeutics by experiments upon the effects of simple medicines. In the midst of his activity and usefulness he was cut off by a malignant fever, probably the consequence of his numerous dissections. His friend and physician, Corvisart, wrote to Napoleon in these words: "Bichat has just fallen upon a field of battle which counts more than one victim; no one has done so much, or done it so well, in so short a time." He was the creator of general anatomy, or of the doctrine of the identity of the tissues of the different organs, which is the fundamental principle of modern medicine.

Bichir, bē-shēr', one of the African mud-fishes (*Polypterus bichir*), which inhabits the upper Nile and its tributaries, and is regarded as the best food-fish of those waters. It is only about a foot long, and is one of the few remaining species of the great extinct group *Ganoidae* (q.v.), and is related to the American gar-pike. See MUD-FISH; REED-FISH.

Bichloride (-klo'-) of Gold, a substance formed by the action of chlorine gas upon dry metallic gold that has been previously thrown down in the form of an impalpable powder, by chemical means. Some authorities assert that the substance so formed is a true chemical compound, having the formula AuCl_2 ; while others maintain that it is a mere mixture of metallic gold and the well-known trichloride, AuCl_3 . The so-called "bichloride of gold" has risen into notoriety on account of the use made of it by the late Dr. Keeley of Dwight, Ill., in the cure of dipsomania and chronic alcoholism. Its gen-

eral characteristics, chemically and physiologically, are to a great extent similar to those of mercury bichloride. Its employment by Dr. Keeley produced a profound impression on the medical world, and many partisans both for and against its virtues exist. The success, from a financial standpoint, of the Dwight sanitarium, brought forth many imitators, and much harm has been done by unskilful persons using this dangerous and powerful medicinal agent.

Bickerstaffe, Isaac, Irish dramatic writer: b. Ireland, about 1735; d. about 1812. He wrote many successful pieces for the stage, some of which such as the operas of 'Love in a Village' and 'The Padlock,' are still represented. His celebrated comedy of 'The Hypocrite,' adapted from Colley Cibber's 'Nonjuror,' which was again borrowed in its leading incidents from Molière, long retained its place on the stage, with its well-known characters of Mawworm and Dr. Cantwell. The music of many of Bickerstaffe's pieces was composed by Charles Dibdin. Latterly he retired to the Continent, and died there.

Bick'ersteth, Rev. Edward, English clergyman. b. Kirkby-Lonsdale, Westmoreland, 19 March 1786; d. 24 Feb. 1850. He was educated in the grammar school of his native town, and at the age of 14 found a place in the post-office, London, where he remained for six years, afterward spending five years as an articled clerk with a London attorney. He then commenced business as a solicitor in Norwich, in partnership with his brother-in-law, and soon was in receipt of a large and increasing income. A great change, however, came over his mind and he began to exert himself in promoting the diffusion of the truths of religion among his fellow-men. Among other works accomplished by him was the establishment of the Norwich Church Missionary Society. He also published in 1814 'A Help to the Study of the Scriptures,' which met with great success. He then resolved to abandon the legal profession for that of a minister of the Church of England. The Church Missionary Society wished to send him abroad on a special mission to Africa, and in this view the bishop of Norwich, dispensing with the usual course of a university education, admitted him to deacon's orders on 10 Dec. 1815, and a fortnight afterward he was admitted to full orders by the bishop of Gloucester. Mr. Bickersteth thereupon, with his wife, proceeded to Africa, from which, after accomplishing the objects of his mission, he returned in the following autumn. He now filled the office of secretary to the Church Missionary Society, and from this period to 1830, when he resigned it, was indefatigable in the performance of its multifarious duties. In the year last mentioned he became rector of Watton, in Hertfordshire, and spent there the remainder of his life. He had now become widely known as one of the most influential and popular clergymen of the evangelical section. Besides taking an active share in furthering the cause of the various religious societies, including the Evangelical Alliance, of which he was one of the founders, he likewise issued a series of publications which had an immense circulation, among others: 'The Christian Student'; 'A Treatise on the Lord's Supper'; 'A Treatise on Prayer'; 'The Signs of the Times'; 'The Promised Glory of the

BICKMORE—BICYCLE

Church of Christ'; 'The Restoration of the Jews'; 'A Practical Guide to the Prophecies,' besides sermons and tracts without number.

Bickmore, Albert Smith, American naturalist. b. St. George, Me., 1 March 1839. He graduated at Dartmouth College in 1860, and studied under Agassiz at the Lawrence Scientific School of Harvard. In 1865-9 he traveled in the Malay Archipelago and in eastern Asia; in 1870 became professor of natural history in Madison (now Colgate) University, and in 1885 professor in charge of the department of public instruction at the American Museum of Natural History, New York. His publications include: 'Travels in the East Indian Archipelago' (1869), 'The Ainos or Hairy Men of Jesso' (1869), 'The Ainos or Hairy Men of Jesso'; 'Sketch of a Journey from Canton to Hankow'.

Bicknell, Frank Martin, American author: b. Melrose, Mass., 24 Jan 1854. He graduated at the English High School, Boston, in 1872; engaged in business till 1888; and afterward devoted himself to literature. He has contributed largely to 'St. Nicholas', 'Harper's Young People', 'Youth's Companion'; 'Outing'; New York *Evening Post*, etc. He wrote 'The City of Stories', 'The Apprentice Boy'; etc.

Bicknell, Thomas William, American educator. b. Barrington, R. I., 6 Sept 1834. He was graduated from Brown University in 1860. During his senior year in college he was elected to the Rhode Island legislature, and after graduation was principal of schools in Rehoboth, Bristol, and Providence, R. I., and in Elgin, Ill. In 1869-75 he was commissioner of the public schools of Illinois, and during this incumbency he secured the establishment of the State Normal School. He founded, edited, and owned 'The Journal of Education'; 'The Primary Teacher'; 'The American Teacher'; 'Education', and 'Good Times,' between 1874 and 1886. He has been president of a number of educational institutes and Sunday-school unions. He has written 'State Educational Reports'; 'John Myles and Religious Toleration'; 'Life of W. L. Noyes'; 'Brief History of Barrington'; 'Barrington in the Revolution'; and 'The Bicknells'.

Bicycle, a light steel vehicle consisting of two wheels arranged tandem, united by a frame with the rider's seat upon it; propelled by his feet acting on pedals connected with one of the axles, at present that of the rear wheel; and steered by a handle-bar guiding the direction of the front wheel. As at present constructed the wheels are of equal size; the driving mechanism is usually a chain with the links fitting over a sprocket-wheel, but about one in 25 are chainless, mainly with a shaft and bevel driver; the weight is 23 to 27½ pounds, complete; the frame is of hollow cold-drawn tubing, with brazed joints; the wheels are suspension, with crossed tangent spokes, wooden rims, pneumatic tires, and ball bearings. The name dates from about 1865, though first so spelled in a patent of 8 April 1869, and elsewhere called "bysicle," "bicircle," "bicycular velocipede," etc.; but prior to 1870 the form of the machine was usually called a velocipede, a French name dating from 1770.

The pedomotor itself goes back perhaps to Egyptian and probably at least to classic times, winged figures astride of a stick connecting two wheels being found in the frescoes at Pompeii.

In the 17th century it suddenly appears with surprising frequency; there is a picture of a bicycle in a stained-glass window at Stoke Pogis, England; in August 1665, John Evelyn writes in his diary of "a wheele to run races in"; in 1690 a Frenchman named De Sivrac invented a two-wheeled *célérifère* having a horse-shaped wooden body with a saddle, and steered by the rider's feet; in 1693 Ozanam described before the Royal Society a vehicle pedaled by a foot traveler. In 1761 the 'Universal Magazine' describes a similar one invented by an Englishman named Ovenden; in August 1769 the 'London Magazine' describes "a chaise to go without horses." On 27 July 1779, *Le Journal de Paris* describes a *vélocipède* invented by MM. Blanchard and Magurier, which is merely the *célérifère* with an upright bar to support the hands; this gained considerable vogue. From France and England the idea spread to Germany, which added to it the one idea needed to vivify it. In March 1784 one Ignaz Trexler, of Gratz, Austria, invented a pedomotor credited with the speed of a galloping horse— unquestionably meaning down hill. But the direct progenitor of the modern bicycle was one built in 1816 by Baron Karl von Drais, Freiherr von Sauerbronn (1784-1851), chief forester to the Grand Duke of Baden (to whose memory in 1891 the bicyclers erected a monument at Karlsruhe), often called "the father of the bicycle." It was designed to aid him in his daily journeys. The whole was of wood; the wheels of equal size, connected by a perch, astride which the rider sat in a saddle, and to the fore end of which was swiveled a fork into which the front wheel was axled, the rider propelled it on level ground or up hill by striking the ground with his feet, and coasted down hill. But the significant feature, the germ of the bicycle, was the pivoting of the front wheel and its steering by a handle-bar; for which there was a stuffed arm-rest on an elevated cross-piece. Drais patented this in Paris, 1816, and claimed that it would go up hill as fast as a man could walk, on a level, after a rain, at six or seven miles an hour, or courier's pace, the same when dry at eight or nine, and down hill at a horse's gallop. It excited much attention and was called the "draisine"; and in 1818 one Dennis Johnson patented in England an improved form called the "pedestrian curricule," with adjustable saddle and elbow-rest. This started a fashionable furore, and those who could not afford it laughed at it as the "dandy-horse," and "hobby-horse," while the serious-minded invented a swarm of names for it, such as "patent accelerator," "swift-walker" (a literal translation of "velocipede"), "manivelociter," "bivector," etc. and finally, in 1819, "bicipede" and "tricipede"; but by this time the name "velocipede" had become the recognized current term. It had then become common enough to be prohibited in London, and to make dodging the machines a common exercise on the suburban roads; and bred complaints of leg disease, and a consequent invention by one Birch for using the arms instead. In 1821 Louis Gompertz patented an improvement in which the handle-bar was connected with a segment rack gearing into a pinion on the front wheel, so that either arms or feet could be used for propulsion; but the craze had worn itself out, and

BICYCLE

it was nearly half a century before it revived with a better machine. Meantime, in June 1819, the curricule had been introduced into the United States, and became a craze in Boston, New York, Philadelphia, etc.; and many riding-schools were opened. On 26 June 1819 William K. Clarkson was granted a patent for an "improved velocipede"; but the excitement soon subsided here also. The grotesque appearance of a person leaning forward on his elbows and kicking away at the ground beneath his clumsy vehicle proved too much for the national sense of humor, and riders were the objects of ridicule. A typical "hobby-horse" in the early 'twenties had the following specifications: Wheels, wood, 32 inches; wheel base, 4 feet 7 inches; backbone, wood, 5 feet 9 inches long; saddle, hard wood, 1 foot 6 inches long; handle-bar, wood, 9 inches, elevated 48 inches above ground; finish, black paint; weight, 90 pounds. The arm-rest was of wood.

With the death of the draine the idea was not altogether forgotten; both in England and on the Continent scattering pedomotors were built every few years, and the capital improvement of putting cranks on the front axle, creating the true modern bicycle, was at length devised. It is asserted, though not proved, that one Kirkpatrick McMillan of Courthill, Scotland, having tried in 1835 a system of cranks, side-levers, connecting-rods, and pedals, for propelling a tricycle, applied them successfully to a wooden bicycle in 1840; and it is certain that in 1846 Gavin Dalzell of Lesmahagow, Scotland, who had heard of McMillan's machine, invented and rode a rear-driving velocipede propelled by pedals on hanging levers, which, by means of connecting-rods instead of chains, rotated cranks on the rear axle. This machine, whose wheels were of wood shod with iron, and its frame somewhat dipped like the present ladies' wheel, made 10 or 12 miles an hour; it was a rather striking forecast of the modern "safety," though not in the least a germ of anything, as its existence was not known till 1892. It had also some important differences: the rear wheel was the larger, as in the "Humber" and "Star" machines, and the action was to-and-fro and not rotary. In 1855 a German instrument-maker named Philipp Maritz Fischer made and extensively rode a velocipede. But none of these were ever made for any persons but the owners, nor incited further invention.

The real ancestor of our bicycle, the crank-driven velocipede that led straight to better things, arose in France: the honor of the invention is hotly disputed. According to one account it belongs to Ernest Michaux, the son of a Parisian carriage repairer (to whom a monument was erected in 1894); but if so, he did not make it public and it led to nothing, and it is generally accredited as theory, where it belongs as practical result, to Pierre Lallement, a Parisian blacksmith, said to have been in Michaux's employ. It sprang, in fact, not from Michaux's, if that existed, but from a multicyle invented in 1865 by one Marechal; a five-wheeler, each wheel having an independent axle with cranks, loose pedals, and a separate seat; the front was the guide-wheel, but it could be ridden by one or many. In September MM. Woirin and Lecomte patented a tricycle, with two smaller rear wheels on the same axle, and a large front one with cranks and loose pedals, the whole connected with a wooden horse-shaped body like

De Sivrac's, on whose back the rider sat well over the front wheel; this was the progenitor of the modern tricycle. Lallement, against the judgment of his friends, who thought that keeping one's balance would be impracticable on two wheels tandem, applied the principle thus the same year, learned the art of balancing, and exhibited his machine and his skill at the Paris Exposition of that year; but thought too little of it to patent it. The next year (1866) he came to the United States to look for work, made a velocipede and rode it about New Haven, Conn., and was induced by one James Carroll to patent it with him, which was done 20 November. It had two wooden wheels, the front one slightly the larger, with iron tires; was a front-driver; and the saddle was on a steel spring midway between the wheels. But it was too crude and unpleasurable to attract much notice. In France, however, great improvements were shortly made on it, and in the winter of 1867 it became the sensation of Paris; riding schools sprang up all about, and straps to fasten the machines were part of the equipment of the great places of amusement. This continued till the Franco-German war temporarily destroyed the business, which had developed a large manufacturing interest. Meantime, in England, Edward Gilman in 1866 had patented a rear-driver with a single treadle, and the chain gear had been broached. In 1869 the improved velocipede and the reflex of the French enthusiasm brought it into sudden vogue in the United States, and American inventiveness was turned toward perfecting it: at the time the "boom" burst in 1870 the Patent Office was receiving half a dozen applications for new patents every week. Up to 1869 the two wheels were of about the same size, 30 to 40 inches; and the earlier machines had wooden hubs, spokes, and rims, with steel tires. But the wire-spoke suspension wheel, re-invented in France in 1864, soon came in, and by 1869 all-steel wheels with hollow tubing were built; the prices were from \$75 to \$300, and cycling was a mark of some social distinction. In the West it was the universal roading sport, the leading manufactories being located there; rinks were built everywhere, and the wonderful trick-riding possible with the heavy wheels then made,—on flights of stairs, by jumps, etc., which our modern light wheels would not endure,—drew large crowds. But this weight,—116 pounds was medium, and in 1871 a 75-pound racer was much borrowed from its lightness,—made the sport a heavy tax even on the athletic, and insupportable to any others; the rigid tire made the jolting on rough roads or paved streets a torture, so that a current nickname for the machine was "bone-shaker." The low build covered the rider with the dirt of roads and carriages, and to avoid this and gain speed the front wheel was gradually raised and the seat carried up with it, and in 1869-70 two western builders placed large numbers of high or "ordinary" wheels on the market. But the steel tire made the exertion still more severe; and hostile municipal legislation, controlled by the horse owners, drove the bicyclers off every desirable riding road. The sport (till the "safety" came in it was only such) collapsed, with the suddenness of a financial crash, within a single week; thousands of machines, worth \$100 to \$150 one day, could not be sold at any price the next, and were ultimately disposed of to boys or the poorest classes at

BICYCLE

nominal prices, or allowed to become old iron; manufactories crowded with orders had them countermanded in a mass; rinks no longer drew; and what little was left of the sport, among those who owned fine machines and clung to them, was killed by the sale at nominal prices of a stock of cheap wheels made of gas-pipe, malleable fittings, and wooden wheels with steel tires, which soon fell to pieces, but destroyed all prestige in the sport. It was nearly a decade before America took it up again in any general way, and then with a different wheel, the bicycle proper.

Meantime a great development had gone on in England, where the hard, smooth macadam roads, and beautiful by-paths for cyclists without disturbing horses, made all conditions more favorable. The bicycle under that name was patented 8 April 1869; it had steel rims and solid rubber tires, round or half round. For speed the front wheel was gradually enlarged and the rear reduced to a mere steerer, till the Ordinary was attained in 1871, with a 40- to 48-inch front wheel and 16-inch rear; it was made feasible and popular by the rubber tires, which reduced the friction and jar, and consequently the needed propelling power. The front wheel was gradually raised in proportion to the rider's height and skill, and in the early eighties attained 60 and even 64 inches. It still remains the perfection of grace and simplicity in bicycle construction the motive power being applied direct, and the wheel, with cranks and pedals, forming a solid body. It is also the most exhilarating to ride, given strength and skill. The greatest improvements were made by James K. Starley, of Coventry, England, the second "father of the bicycle"; his wheels in 1873 had become nearly all that made the best Ordinary, with steel frame, cross tension spokes, and solid rubber tires. In 1874 he patented the tangent wheel.

The Ordinary, however, could not be the bicycle of the future. It was hard to mount, except in favorable spots, and if the rider was dismounted had often to be walked long distances on streets or hillsides; both from this and the great air resistance due to the rider's elevation, it was merely the sport of a few athletic men, mostly young; headers were frequent from the rider's mass centre being directly over that of the large wheel, and liable to be serious from his high seat, though the danger was exaggerated. A safer build was therefore mooted. The first idea was to bring the rider's centre below that of the driving wheel; this could only be accomplished by operating the pedal with some kind of leverage, and a rear-driving safety with lowered front wheel was patented in 1879 by H. T. Lawson of England. A similar type, called the "Bicyclette," followed in 1880. In the same year the "Star," a reversed Ordinary with the small wheel in front, was introduced and had something of a run; the "Humber Safety" in 1885 copied the type with more extreme difference in wheels, and the current joke upon it was an imaginary Irish description that "the big wheel is the smallest and the hind wheel is in front." But with the high wheel there is always liability to a tumble, and a "backfall" is worse than a "header"; and the "Dwarf Bicycle," as the

safeties were called, grew in favor. The "Extraordinary" and the "Facile" about 1882 had some trial; but a more popular form, which had high racing speed and made new records, was Starley's "Kangaroo" (1883), with diamond frame, independent crankshafts, and two chains gearing them to the front wheel. The gain of the geared wheel over the Ordinary is not only in lessened air resistance from the lower seat, but because length of crank and pedal speed can be gauged to the most favorable speed for the rider, while in the Ordinary the crank is too short and the pedal speed too rapid for the best results. But the alternate tightening and loosening of the chain twice in every revolution, and other defects, caused its early displacement by Starley's famous and still speedier "Rover" (1884), for a long time the popular term for "safeties" of any pattern. Here the cranks and pedals were on a separate axle, connected with the driving-wheel by a single chain which was therefore permanently tight, the seat was far back over the rear wheel, so that headers over the handle-bar were absolutely impossible. The front wheel was about one fourth larger than the rear; later they were made of practically the same size as now, completing the evolution back to the velocipede, and making its general utility possible. With the low seat any one can mount, and the exercise is not too severe; and it makes possible the drop-frame for ladies. The Ordinary, as its name implies, maintained the field for a while; the sporting idea was still in the ascendant, the "safety" was sneered at as the effeminate and rather cowardly refuge of weaklings and old men, and it was not believed that it could compete in racing speed. But about 1886 the public began to realize its immense business and social advantages, and with numbers the fear of ridicule vanished; by 1888 five sixths of the sales were of "safeties," and by 1890 the Ordinary had become a curio or the equipment of trick riders. For many years now both names have gone out of use, all being "safeties," and the compendious "bicycle" or simply "wheel" (a reminiscence of the Ordinary, where the driving-wheel was everything) covers all. This advent of the "safety" has carried the bicycle into everyday business and the life of every household; carriers, policemen, messengers, etc., find it of great service, competition has lowered prices to the level of the very servant-girls and street boys, and there is hardly a spot in the modern world into which it has not penetrated. There are great manufactories engaged in bicycle manufacture, and also in making the machines used in their construction. In the United States alone, in 1900, nearly 20,000 people were earning their living by their direct manufacture, besides more than 6,000 establishments and nearly 10,000 persons employed in repairing and many more in selling them. Even in war they have shown their utility. They have been adopted for military purposes by many of the nations of the world by Austria-Hungary in 1884; by England and Switzerland in 1887; by Belgium in 1889. The French army is said to be equipped with several thousand bicycles, and a perfected system of drill and tactics for advance-

BICYCLE

guard duty, skirmishing, and rapid movements has been introduced into the various armies. A detachment of bicycle-mounted soldiers has been found useful in accompanying the motor Maxim gun, first tried in 1899. The military bicycle is especially constructed for hard work and rough usage. Some of the French machines are made to fold, so that when the riders come to impassable ground they can double them up and carry them on their backs.

Partly effect but mainly cause of this general use has been the direction of inventive genius to the advancement of speed or comfort, often both at once. Every feature,—material, frame, spokes, gearing, tire, bearings, rim, handle-bar, brake, and others,—has been vigilantly and tirelessly studied to win public favor, and there is hardly a more wonderful machine existent. The enormous brain-power devoted to its perfection is shown by the fact that in the United States alone 7,573 patents had been granted up to 1900 for cycles and their parts, and probably double that in the world altogether. Of these, in our own country only 16 had been issued before 1865, and the great majority were granted after 1890. In 1892 the applications had grown so numerous that a special department of the Patent Office was created for them.

The greatest of all single ones, and the one which has revolutionized the business and made cycling a luxury rather than an exertion, is the pneumatic tire, which not only saves jolts by rolling into instead of on and off the minute obstructions of the roadway, but for the same reason increases speed, each rise of the wheel taking so much more muscular exertion. It must be confessed, however, that a heavy price is paid in the endless nuisance of punctures, ending many rides abruptly, and involving a walk for miles—something unknown with the solid tire. It was originally invented, not for bicycles, but road wagons, by an English civil engineer named R. W. Thompson, in 1843, and patented in the United States in 1847, but fell flat and was allowed to lapse. The first bicycle tires were iron or steel; then a strip of rubber was fastened over the tire; later, a round or half-round piece of solid rubber was cemented or fastened into the hollow of the rim. But in 1889 an Irish veterinary surgeon, Dr. John B. Dunlop, fitted a piece of rubber hose to his son's bicycle; it worked so well that he patented it, not broadly, but for specific details now disused. Shortly after, I. W. Boothroyd of London described, but did not patent, a tire of this sort; and about the same time P. W. Tillinghast, of Providence, R. I., patented one in this country. Received with utter incredulity at first, and a not unjustifiable dread of punctures, in two years 40 per cent of all bicycles were fitted with it, and in two more no other was on the market. (The cushion tire, a large tire, solid except for a small air space running through it, was tried for a time in 1891 and after but was not a success.) But even this would have been ineffectual save for the enormous reduction in weight by the use of steel weldless tubing and wire, so that a machine of the incredibly small weight of nine pounds has been used for racing, with a wheel on whose spokes

four men can stand without injuring them: these machines are too frail for road use, but even the average roadster does not reach 28 pounds, while in 1873 65 pounds, and even in 1885, 48 was thought fair, and 27 a racing wonder.

The ball-bearing, invented by an Englishman named Bonn, is another epoch-making invention, which revolutionized all previous theories. The earliest bicycle bearing was a plain one with a sleeve, known as the parallel bearing. The friction was so heavy that the roller bearing was substituted, but did not work well; the next was the adjustable cone, which for a time was the universal one. But in all solid-surface bearings the grinding of the sand which worked in made them irregular and rattling after a while, and the layers of gudgeon grease required a steady tax on time for cleaning. In the ball-bearing, the conical axle bears against a row of steel balls in a circle, tangent to the bearing surface and to two other surfaces at right angles, so that the friction is only against three points, and the bearing parts roll over instead of sliding upon each other. The wear of the balls is astonishingly slight, and from the constant change of surface there is little irregularity, and from the small contact points scarcely any making of axle grease.

A fundamental invention is the suspension wheel, by which, in the words of an English patentee of 1826, "the weight they have to carry is suspended from that part of the wheel which happens to be uppermost, instead of being supported, as is usual, by the spokes that happen to be under the axle-tree"—a principle invented by Leonardo da Vinci before 1490, re-invented as above stated, and in France in 1864. Spring seats have abolished the saddle-galling which was one of the worst tortures of the "bone-shaker," and even of the earlier bicycles. The wooden rim takes two and a half pounds off the weight of a machine, but is not used in England, the roads being too wet. The drop-frame for ladies' use is perhaps the most important single advance made on the velocipede, so far as the increase of social pleasure is concerned. In the same line are the construction of coupled machines for two, taking away the reproach often made that bicycling is "an essentially selfish pleasure." The coaster-brake is another important advance. The chain gearing which made the "safety" possible has been noted; later, much ingenuity has been employed to get rid of it, but not with perfect satisfaction, the cost being prohibitive to the mass, and the complaint of extra exertion being heard. The two chief devices for chainless machines are the pin-wheel gearing, which works smoothly but lacks durability; and the bevel gear, which is very difficult to cut so that the teeth shall fit exactly, but is said to increase in both accuracy and ease of driving with use, as the surfaces of the teeth grow to fit each other. In the chain gear the case is the reverse, as the links and rivets wear and dust grinds them off.

In the United States the bicycle did not appear after the collapse of 1870 till the Centennial Exposition of 1876, when some English machines were imported and exhibited. Col. Albert A. Pope of Boston saw them and thought of reviving the business here; went to England to study the industry, brought back some English wheels, and had W. S. Atwell of Boston build him one, weighing 70 pounds, and costing \$313. Again

visiting England, he decided that conditions here warranted their manufacture for the market, and in 1878 had the Weed Sewing Machine Company, of Hartford, Conn., make some "Columbias" for him in a corner of their shop, the first bicycles made in America. From the first, these have been the American model of durability and excellence of make, as well as of advanced invention in construction and fittings, and unsurpassed in the world, and they still maintain that position. The business has grown into one of the great manufactories of the country, and was the chief of the companies merged in the American Bicycle Company a few years ago. The "safety" brought the same expansion here as elsewhere; but its very commonness and cheapness, with other causes, has, since about 1895, produced a severe decline. The chief falling off is in women's use they have tired of it, as they do of every muscular sport except when novelty gives a brief stimulus or social opportunity; and the lamp laws in many localities nearly killed evening parties, the chief use they could make of it. The slackening of this demand produced a severe crisis in the business. Also, inventions have nearly reached their limit, to tempt youth with money to buy the latest new pattern, and the business has settled upon a firm though more limited basis of practical service and every-day pleasure. The statistics of the industry in this country, as returned by the census of 1900, were as follows, showing its almost incredible development; but in fact it was far greater and quicker, as the volume was much greater about the middle than at the end of the decade

	1890	1900
Number of establishments.....	27	312
Capital	\$2,058,072	\$29,783,659
Number of employees.....	1,797	17,545
Wages paid	\$982,014	\$8,189,817
Cost of materials	718,848	16,792,051
Value of products	2,568,326	31,915,908

Of the 312 establishments, however, 35 were in the American bicycle trust. Of these total values, \$23,689,437 was for bicycles; 1,136,122 being chain, 42,929 chainless, 3,640 tandem, and 159 motor. The difference between the production of chain and chainless is sufficiently accounted for by the immense difference in price—average at the factories, \$18.91 for the former, against \$45.59 for the latter.

See H. A. Garratt, 'The Modern Safety Bicycle' (New York 1899); Andrew Sharp, 'Bicycles and Tricycles' (London 1896), and the valuable historical summary in the United States census reports of 1900, 'Manufactures' (Part IV., p. 329).

Bida, Alexandre, bē'da, al-ek-sōndr, French painter. b. 1813, d. 2 Jan. 1895. He traveled in the East for two years, and most of his paintings have Oriental or Scriptural subjects. His best-known work is his illustrations for the 'Four Evangelists' (1876), and the 'Book of Ruth'; among his paintings are 'The Slave Market,' 'The Massacre of the Mamelukes,' 'Jews Praying at the Well of Solomon,' and 'The Field of Boaz.'

Bidar, bē'dar, India, an ancient town in the Nizam's dominions, 75 miles northwest of Haidarābād; noted for the metal ware to which it has given the name of Bidri or Bidery. It occupies a commanding site above the surrounding country, and its mosque and madrisa or

college testify to its former splendor and importance. Pop. 14,000.

Bidassoa, bē-das-sō'a (Basque, "way to the west," or "two streams"), a river in Spain, about 45 miles long, the last 12 of which form the boundary between France and Spain. It rises in the mountains of Spanish Navarre, and, after various changes of direction, falls into the Bay of Biscay near Fontarabia. In former times Spain claimed not only the entire river, but so much of its banks, on the French side, as its waters covered at full tide. This difference was finally settled by each country contenting itself with its own shore. Near Irun there is a small island in the middle of the stream, called the Island of Pheasants, on which, being neutral ground, Louis XI and Henry IV. met in 1463. Here also a peace was concluded between France and Spain in 1654.

Biddeford, Maine, city in York County, on the right bank of the Saco River, 6 miles from the sea, and on the Boston & Maine R.R., 15 miles southwest of Portland. The river separates it from Saco (q.v.), and, like that city Biddeford grew up as a manufacturing centre, its development being favored by the abundant water-power furnished by the falls, the stream descending here about 40 feet. The city also has a large local trade.

Industries—The leading industries include the extensive manufacture of cotton goods, lumber, boots and shoes, machinery, etc. Here are some of the most important cotton mills in New England, the products of which are found in the markets of many states. Near the city are granite quarries which annually produce large quantities of superior stone, used in many parts of the world. Several thousand people are employed in the city's industries, and the flourishing of these has led to its gradual growth. It has two national banks.

Schools and Churches—The public school system is well organized and conducted, and the various religious denominations are represented by 14 churches. The intellectual life of the people is also stimulated through useful local publications and an excellent public library.

History and Government—The city was named from Biddeford, England, the home of some of its early settlers. In 1616 a small settlement was made at Biddeford Pool, near the mouth of the Saco, and Biddeford was settled under a patent in 1630, embraced Saco until 1718, and was then incorporated under its present name. This was long the chief settlement of the Maine province. In 1855 Biddeford received a city charter. The present government includes a mayor and a city council, elected annually. The population in 1900 was 16,145. In 1903 it was estimated at 16,655. Consult: Folsom, 'History of Saco and Biddeford' (1830); Clayton, 'History of York County' (1880); Ridlon, 'Saco Valley Settlements and Families' (1895).

Biddle, Anthony Joseph Drexel, American publisher, journalist, and miscellaneous writer: b. Philadelphia, 1 Oct. 1874. He has written 'A Dual Role, and Other Stories,' 'An Allegory and Three Essays,' 'The Madeira Islands,' 'The Froggy Fairy Book,' 'All Around Athletics' (1894); 'The Flowers of Life' (1898); 'Shantytown Sketches' (1898).

BIDDLE

Biddle, Arthur, American lawyer: b. in Philadelphia, Pa., 23 Sept. 1852; d. 8 March 1897. He studied law and was admitted to the bar in 1878. Later he became a member of his father's firm and devoted much time to the study of certain branches, the results of which were published in his works, 'Treatise on the Law of Stock Brokers' (1881); 'Treatise on the Law of Warranties in the Sale of Chattels' (1884); and 'The Law of Insurance' (1893).

Biddle, Clement, American Revolutionary soldier: b. Philadelphia, 10 May 1740; d. there, 14 July 1814. He was educated in the tenets of the Society of Friends (Quakers), and in early life engaged in commercial pursuits in his native city; but notwithstanding his Quaker training, he joined a number of Quaker friends, in 1764, in forming a military corps for the protection of a party of friendly Indians who had sought refuge in Philadelphia from the fury of a band of lawless zealots known as the "Paxton Boys," who had recently massacred some unoffending Conestoga Indians at the interior town of Lancaster. These banditti, powerful in numbers, had advanced within five or six miles of the city, threatening destruction to all who should oppose them, when the vigor of the military preparations checked their further progress. Scarcely had this local disturbance been quieted when news was received of the resolution of the British House of Commons to charge certain stamp duties in the colonies. The feeling engendered throughout the whole country by this step and by the subsequent passage of the Stamp Act, induced, in Philadelphia, the celebrated "non-importation resolutions" of 25 Oct. 1765, signed by the principal merchants of the city, including Col. Biddle and his brother Owen. When all hope of a reasonable adjustment of the differences was lost, Col. Biddle was greatly instrumental in forming the "Quaker" company of volunteers raised in Philadelphia in 1775, of which he was elected an officer before the corps joined the army. Congress, on 8 July following, elected Col. Biddle deputy quartermaster-general of the militia of Pennsylvania, New Jersey, Maryland, and Delaware, ordered to rendezvous at Trenton. Col. Biddle took part in the battle of Trenton at the close of the same year, and, with another officer, was ordered by Washington to receive the swords of the Hessian officers. He was also engaged in the victory of Princeton, the surprise and retreat at Brandywine, and the unsuccessful enterprise of Germantown, and during the winter of 1777-8, shared the sufferings of the American army at Valley Forge. As commissary-general of forage under Gen. Greene he rendered important service to the army in several critical junctures, especially during the famine at Valley Forge. At Monmouth he shared the success of his countrymen. In September 1780, owing to the pressure of his private affairs, he was compelled to return to private life. His military career, however, was briefly renewed in the capacity of quartermaster-general of Pennsylvania in the expedition under Washington, in 1794, against the whiskey insurgents of that State. Col. Biddle labored earnestly also in the early political movements of the patriot party of his State, advocating effectively the revolutionary State constitution of 1776 (which his brother Owen had had, as a member of the convention, a share in framing).

He was also active in support of a declaration or bill of rights as a constituent part of the Federal Constitution to prevent abuse or misconstruction of its powers. After the organization of the Federal government under the Constitution of 1787, Col. Biddle was appointed marshal of Pennsylvania, as an evidence of the regard in which he was held by Washington.

Biddle, James, American naval officer: b. 28 Feb. 1783; d. 1 Oct. 1848. He was educated at the University of Pennsylvania, and entered the navy in 1800. In the war against Tripoli he served as a midshipman, was taken prisoner and kept in confinement for 19 months. In the War of 1812, he was a lieutenant on the *Wasp* when she captured the *Frolic* and was later captured by the *Poictiers*. Though a prisoner for a short time, Biddle was exchanged, and in 1813 took command of the *Hornet* and captured the British brig *Penguin* on 23 March 1815, being wounded in action. He was made captain in 1815, and received a gold medal from Congress in reward for his services. He was afterward commissioner to Turkey and China, and in 1845 negotiated the first treaty between the United States and China. He also served in the Mexican war.

Biddle, John, English Socinian writer: b. Wotton-under-Edge, Gloucestershire, 14 Jan. 1615, d. London, 22 Sept. 1662. He entered Magdalen College, Oxford, in his 19th year, and graduated A.M. in 1641. Being led to doubt the doctrine of the Trinity, he drew up 'Twelve Arguments' on the subject, for which he was committed to jail, but was released on bail. About six months afterward, on examination before a committee of Parliament, he acknowledged his opinion against the divinity of the Holy Ghost, and his 'Twelve Arguments' were ordered to be burned. He persisted in his opinion, and in 1648 published two tracts, containing his 'Confession of Faith Concerning the Holy Trinity,' and 'Testimonies' of Irenæus, Justin Martyr, and several other early writers on the same subject. On this the Assembly of Divines asked Parliament to decree the punishment of death against those who should impugn the established opinions respecting the Trinity, and to enact severe penalties for minor deviations. Such a decree was passed, but differences of opinion in the Parliament itself, and the penalties to which this sweeping measure rendered many in the army liable, prevented its execution. Biddle was again remanded to prison, however, and remained for some years in rigorous confinement. A general act of oblivion in 1651 restored him to liberty, when he immediately disseminated his opinions both by preaching and by the publication of his 'Twofold Scripture Catechism.' For this he was confined in the Gate House for six months. Cromwell banished him to St. Mary's Castle, Scilly Is., assigning him an annual subsistence of 100 crowns. Here he remained three years, until liberated in 1658. He then became pastor of an Independent congregation, and continued to support his opinions until fear of the Presbyterian Parliament of Richard Cromwell induced him to retire into the country. On the dissolution of that parliament he preached as before until the Restoration, after which he was obliged to confine himself to private preaching. In June 1662 he was apprehended at one of the private assemblies, and

BIDDLE — BIDPAI,

upon process of law fined £100, and ordered to lie in prison until it was paid. He fell a victim to jail fever and died in the 47th year of his age, a martyr to religious intolerance. His private character was moral, benevolent, and exemplary, and Toulmin styles him the "father of the modern Unitarians."

Biddle, Nicholas, American naval officer: b. Philadelphia, 10 Sept. 1750; d. 7 March 1778. In 1765, while on a voyage to the West Indies, he, with two others, chosen by lot, were left for two months on an uninhabited island. In 1770 he entered the British navy. When Phipps, afterward Lord Mulgrave, was about to start on his exploring expedition, young Biddle, though a midshipman, deserted his own vessel and shipped as a seaman on the *Carcass*, serving through the cruise with Lord Nelson, who was a mate of Phipps's vessel. On the commencement of the American Revolution he came to America and was made captain of the *Andrew Doria*, a brig of 14 guns and 130 men, taking part in Commodore Hopkins' attack on New Providence. After refitting in New London he was ordered on a cruise to the banks of Newfoundland, and in 1776 took, among other prizes, two transport ships with valuable cargoes and a battalion of Highland troops. He was appointed to the command of the *Randolph*, a 32-gun frigate, in February 1777. In March 1778 he was wounded in an action with the *Yarmouth*, an English 64-gun ship. While under the hands of a surgeon the magazine blew up, and the whole crew of the *Randolph* were lost, except four men, who were tossed about on a piece of wreck for four days before being rescued. The other vessels of the squadron escaped in consequence of the disabled state of the *Yarmouth*.

Biddle, Nicholas, American financier: b. Philadelphia, Pa., 8 Jan. 1786; d. same city, 27 Feb. 1844. He became secretary to John Armstrong, United States minister to France, in 1804, and subsequently went as secretary to James Monroe, then United States minister to England. He returned home in 1807, was elected to the Pennsylvania legislature in 1810, and was appointed a director of the United States Bank in 1819. He became president of the bank in 1823 and managed it ably down to the expiration of its charter. The financial trouble precipitated upon the country by Jackson's withdrawal of the government deposits in 1833 gave an unfortunate ending to Biddle's career as a banker, but while both his ability and his integrity were questioned at the time, he has been amply vindicated since. Besides miscellaneous writings, he published a 'Commercial Digest,' and 'History of the Expedition Under Lewis and Clarke to the Pacific Ocean.' He was president of the board of trustees for the funds of Girard College, and was instrumental in establishing that institution.

Biddle, Richard, American lawyer: b. Philadelphia, Pa., 25 March 1796; d. Pittsburgh, 7 July 1847. He studied law and was admitted to the bar in Pittsburgh. He was a member of Congress (1837-41), and was author of a 'Memoir of Sebastian Cabot, with a Review of the History of Maritime Discovery' (1831).

Bid'dulph, Sir Michael Anthony Shrapnel, English military officer: b. Cleve Court, Somersetshire, 1823. He entered the Royal artillery

in 1844; became captain in 1850; major, 1854; colonel, 1874; major-general, 1877; lieutenant-general, 1881; and general in 1886. He served in the Crimean war at Alma, Inkerman, Balaklava, and the siege of Sebastopol. In India he commanded the field force and marched to Kandahar and the Helmund, and returned by the Tal Chotali and Boree to the Indus, in 1878-9. He was retired in 1890, and in 1896 became gentleman usher of the Black Rod. He published 'Illustrated Forrester's Norway' (1849).

Bid'eford, England, a market town and municipal borough of Devonshire; 44 miles north of Plymouth; situated on both sides of the Torridge, four miles from the sea, the principal portion being on the west side, on a bold acclivity. A handsome stone bridge of 24 arches, and 677 feet in length, connects the two divisions of the town. It has a spacious marketplace; an Elizabethan town-hall, public assembly rooms, and music hall. The Bridge Hall in French Renaissance style, contains a free library, a reading-room, and a science and art school. The most important church is that of St. Mary, in Perpendicular style, rebuilt, except the tower, in 1865. The chief industries comprise the manufacture of coarse earthenware, and collars and cuffs, tanning, malting, iron-founding, etc. In former times Biddeford had an extensive shipping trade, and is said to have imported more tobacco in some years than the metropolis. Pop. (1901) 8,754.

Bidie, George, English medical officer: b. Blackies, Banffshire, 3 April 1830. He was educated at the University of Aberdeen, and appointed deputy surgeon-general, in charge of the British Burma division in 1884, sanitary commissioner of the Madras presidency in 1885-6. He discovered, in 1867, a preventive for an insect pest which threatened to destroy the coffee growth in southern India. In 1898 he became honorary surgeon to the queen. His publications include 'Reports on the Ravages of the Borer Insect on Coffee Estates' (1869); 'Handbook of Practical Pharmacy' (1883); 'Catalogue of Gold Coins in the Government Central Museum, Madras' (1874); 'Neilgherry Parasitical Plants Destructive to Forest-trees' (1874); 'Catalogue of Raw Products of South India sent to Paris Exhibition' (1878); 'Native Dyes of Madras' (1879); 'Pagoda or Varaha Coins of South India' (1883); 'Sand-binding Plants of South India' (1883); etc.

Bidpai, *bid'pi*, or **Pilpai**. When we consider the wonderful history of 'Bidpai's Fables,' their fame, and their charm, we naturally invest their supposititious author with a personality and a name, in fact, however, "Bidpai" is probably a changed form of an Indian word for "court-scholar," misunderstood as a proper name, and implying therefore neither personality nor specific date. In India, from early times the parable or "example" has been the recognized method of conveying moral instruction. In the didactic literature, some general truth or some rule of life is stated in the form of a maxim, and a beast fable or other story then added as a concrete instance or "example." The folk-lore of which these tales are a reflex is not the exclusive property of any of the great religions of ancient India, but is common to Buddhism, Jainism, and Brahmanism alike. The sculptured representations of the stories upon the great

Buddhist monuments of 250 B.C. make it certain that the stories themselves were familiar to the common people at that early date; and it is hardly less certain that they were so known long before that time. The oldest and most important collection of Indian folk-lore is the Buddhist one called 'Jataka'—that is, 'Birth-stories,' or stories of Gotama Buddha in his previous births: it consists of 550 tales, each containing a moral; each is placed in the mouth of the Buddha, and in each the Buddha plays the best and most important part. It is this device of a framework or setting for the folk-tales that constitutes the principal essentially literary element of the collection. Next in importance to the Buddhist 'Jataka' stands the Brahmanical 'Panchatantra.' Here the material is not essentially different in kind from that of the 'Jataka'; but again it is the setting of the material which gives the work its distinctive literary character. It is a kind of 'Mirror for Magistrates.' Both the 'Jataka,' written in Pali, and the 'Panchatantra,' in Sanskrit, are still extant, and contain many of the stories which in translations of translations attained great currency and celebrity in mediæval literature.

The precise Indian original of these translations is lost; but we know that it was translated into the literary language of Persia (the Pehlevi, or Pahlvi), by command of the Sassanian king, Khosru the Just, about 550 A.D. From the Pehlevi came two notable versions, one the Old Syriac, called 'Kalilag and Damnah,' after the two jackals, Karataka and Damanaka, who figured prominently in the framework of the Sanskrit original; and the other is the Arabic version, called 'Kalilah and Dimnah,' or 'Fables of Bidpai,' made about 750 A.D. by Abd-allah ibn al-Moqaffa, a Persian convert to Islam under the Caliph al-Mansur. According to the Arabic introduction, Dabshelim was the first king of the Indian Restoration, after the fall of the governor appointed by Alexander at the close of his campaign in the Panjab, 326 B.C. When firmly established, Dabshelim gave himself over to every wickedness. To reclaim the king, a Brahman philosopher takes up his parable, as did Nathan before David, and at last wins him back to virtue. The wise man is called in Arabic *bid-bah*, and in Syriac *bid-vag*. These words are traced through the Pehlevi to the Sanskrit *vidya-pati*, 'master of sciences.' Accordingly *bidbah*, which has become Bidpai or Pilpai in our modern books, is not really a proper name, but an appellative, applied to a 'chief pandit' or 'court-scholar' of an Indian prince.

From the Arabic are descended, in the fourth generation from the original, a dozen or more versions, of which three may be mentioned as noteworthy links in the chain of tradition: the Greek one, made about 1080 by Symeon Seth, a Jewish physician; the Persian, made some 50 years later, by Nasr Allah of Ghazni; and the Hebrew, ascribed to Rabbi Joel, and probably made before 1250. Of the descendants in the fifth degree from the original, the 'Directorium Humanae Vitæ,' made about 1270 by John of Capua from the Hebrew, is distinctly the most celebrated, because it gave rise in turn to Danish, Dutch, Spanish, Italian, and French, and above all to the famous German and English versions mentioned below. But besides the 'Directorium,' we must notice the 'Specimen of the Wis-

dom of the Ancient Hindus,' a version into Latin from the Greek of Symeon, made by the Jesuit father, Petrus Possinus (1666); and the 'Anvár-ı Suhailî' or 'Lights of Canopus,' a simplified recast of Nasr Allah's. In the second edition of his fables, La Fontaine tells us that he owes the largest part of his new material to 'Pilpay, the Indian sage.' Pierre Poussin's 'Specimen' was the one embodiment of his shadowy Oriental fabulist, and a French version of the 'Lights' was the other. Two offshoots of the 'Directorium' are of unrivaled interest to the student of the beast fable. The one is the 'Book of Examples of the Ancient Sages'; and the other is Doni's 'La Moral Filosofia' (1552). The 'Book of Examples' was made at the instance of Duke Eberhard in Bart, whose name and motto, 'Eberhart Graf zu Württemberg Attempo,' appear as an acrostic in the initials of the first sections. It was first printed about 1481, and has since been admirably edited by W. L. Holland (Stuttgart 1860). Holland used, besides three manuscripts, two printed editions without place and year, and enumerates 17 dated editions that appeared between 1483 and 1592. Four dated editions appeared at Ulm between 1483 and 1485. The great number of editions of the work, and their rapid succession, are the best proof of its importance as a means of instruction and amusement at the beginning of the age of printing. The examples themselves had doubtless pointed the moral of many an ancient homily long before the days of Gutenberg: but the language of the old German version of them is so remarkable for its simplicity, dignity, strength, and beauty, that we cannot wonder at its immense popularity; and to this version, more than to any other, is Europe indebted for the wide-spread knowledge of this cycle of literature from the last part of the 15th to the middle of the 17th century. The other offshoot of the 'Directorium'—namely, 'The morall philosophie of Doni, drawne out of the auncient writers. A worke first compiled in the Indian tongue, and afterwards reduced into divers other languages, and now lastly Englished out of Italian by Thomas North' (London 1570)—is most interesting to us as English-speaking people because it is "the first literary link between India and England, written in racy Elizabethan," a piece of "Tudor prose at its best," a veritable English classic. Consult Keith-Falconer, 'Kalilah and Dimnah' (1885); Lanman, 'Sanskrit Reader' (1888); Rhys Davids, 'Buddhist Birth Stories' (1880); North, 'Morall Philosophie of Doni' (ed Jacob 1888).

CHARLES ROCKWELL LANMAN,
Professor of Sanskrit, Harvard University.

Bidwell, John, American politician. b. Chautauqua County, N. Y., 5 Aug. 1819; d. 5 April 1900. He went to California in 1841; served in the Mexican war, reaching the rank of major; was a member of the Constitutional Convention of 1849; and of the National Democratic Convention in Charleston, in 1860. In the Civil War he was brigadier-general of California militia. In 1864 he was elected to Congress as a Republican; in 1866 was a member of the Philadelphia Convention; in 1890 was the unsuccessful Prohibition candidate for governor of California; and, in 1892, unsuccessful candidate of his party for the Presidency.

BIEDA — BIELGOROD

Bieda, bē'da, the modern name of the ancient Blera, a town in Italy. It is noted for its extensive Etruscan necropolis of rock-hewn tombs, built in several terraces. These tombs are interesting from their imitation of dwellings. They have molded doorways, and within the ridge beams and rafters of the roof are cut in relief. There are rock benches on three sides, made to receive the dead, and besides the doors, numerous windows.

Biedermann, Friedrich Karl, German author. b. Leipsic, 25 Sept. 1812, d. 1901. He became professor of philosophy in Leipsic University in 1838 and held this chair till 1845, when he was deposed on account of his political opinions. In 1849 he played an important role in the parliament of Frankfurt, and was reinstated as professor at Leipsic, but was again removed in 1853 for political reasons. He was editor of the *Deutsche Allegemeine Zeitung* (1863-6), and founded and edited a number of other liberal papers. His works include 'Wissenschaft und Universitat' (1838); 'Die Deutsche Philosophie von Kant bis auf unsere Tage' (1842-3); 'Vorlesungen über Socialismus und sociale Fragen' (1847); 'Erinnerungen aus der Paul's Kirche' (1849); 'Fünfzig Jahre in Dienste des nationalen Gedankens' (1892).

Biefve, Eduard de, byēf ā-doo-ar de, Belgian painter. b. Brussels, 4 Dec 1809, d. there, 7 Feb 1882. He painted many portraits, and was also noted for his scenes from history. His best known work probably is his 'Compromise of the Netherland Nobles at Brussels, 1566.' Among others are 'Last Moments of Anne Boleyn,' 'The Introduction of Rubens to Charles I of England,' 'Masaniello,' 'Raphael and La Fornarina.'

Biel, bēl, Gabriel, German philosopher: b. Spire, about 1442, d. Tübingen, 1495. He was educated at Heidelberg and Erfurt, and became a cathedral preacher in Mainz. In 1477 he was made provost of Urach, and an adviser in the founding of the University of Tübingen, where he became professor of theology, in 1484. He has been erroneously called "the last of the Schoolmen." His principal work was 'Collectorium ex Occamo.'

Biela, bē'la, Wilhelm von, Austrian officer and astronomer. b. Rossla, 19 March 1782, d. Venice, 18 Feb. 1856. On 27 Feb. 1826, he discovered at Josephstadt, Bohemia, a new comet which, a few days later, was sighted by Gambart from Marseilles. Both noticed its similarity to comets appearing in 1772 and 1805, and fixed its period at between six and seven years, but it was named after Biela, who had first discovered it. Shortly after its reappearance at the end of 1845 it was seen to divide into two portions, each of which afterward developed a tail and a brilliant nucleus, features wanting in the original body. In August 1852 the double comet reappeared, but this time the two portions were much farther apart; and not long after the comet vanished, and has never been sighted since.

Biela's Comet, a comet of short period, named after its discoverer, Wilhelm von Biela (q.v.), who traced it out in 1826 and furnished such data regarding its movements as to convince the other astronomers of his day that he had a proprietary right to it. The same comet had been noticed 8 March 1772, and again in

1805. It was reckoned that the comet had passed its perihelion six times between the two periods without being detected by the astronomers. On another visit it passed out of sight on 3 Jan. 1833. Its next appearance was in July 1839. It was found again late in November 1845, and in the following month an observation was made of one of the most remarkable phenomena in astronomical records, the division of the comet. It put forth no tail while this alteration was going on. Prof. Challis, using the Northumberland telescope at Cambridge, on 15 Jan. 1846, was inclined to distrust his eyes or his glass when he beheld two comets where but one had been before. He would call it, he said, a binary comet if such a thing had ever been heard of before. His observations were soon verified, however. Late in August 1852, the larger came into view and three weeks later the smaller one, now much fainter than its former companion, was seen about 1,000,000 miles in the lead. Schiaparelli's investigations showed it to be probable that the comet is the illuminated central mass of a stream of meteorites. The Leonid stream of meteors revolves around the sun in a period of $33\frac{1}{4}$ years, and the earth passes their orbit every year, but meets the main swarm only when passing the point of intersection of the two paths. On 12 Nov 1799, 13 Nov. 1833, and 14 Nov 1866, the earth is known to have encountered a dense portion of the stream. Astronomers looked for the reappearance of this stream of meteors 13-14 Nov 1899, but were disappointed, only a few stray meteors putting in an appearance.

Bielaga, a Russian name for the great European sturgeon (*Acipenser huso*), also called "hausen" and "huso." See STURGEON.

Bielaya, byēl-a-ya, the name of 10 Russian rivers, the most important of which is about 500 miles in length, rises in the Ural ridge and flows northwest to the Kama River. From April to November it is navigable from its mouth to the city of Ufa, about 200 miles, regular trade in minerals, lumber, and salt being carried on. Of the other rivers of this name, may be mentioned the one in the government of Irkutsk, Siberia, which is a branch of the Angara; and another in the government of Yekaterinoslav which flows through a coal region.

Bielefeld, bē'lē-felt, a town of Prussia, in the province of Westphalia, at the northern foot of the Teutoburger-Wald, 38 miles east from Münster. The river Lutter divides it into an old and a new town. The best German linens are manufactured here, flax-spinning and bleaching are largely carried on, and there are various other industries, among which some of the chief are shirt-making, silk-weaving, the manufacture of cycles and sewing-machines, and of cigars, glass, cement, leather, etc. It contains a gymnasium, two hospitals, and other public buildings. The castle of Sparenburg, built in 1017, is in the immediate vicinity, and since its recent restoration has been occupied as a museum. Pop. (1900) 63,044.

Bielefeld, a small town in Westphalia, Germany, with 50,000 inhabitants. Particularly noted as containing the Bethel colony for epileptics.

Bielgorod, byēl'gō-rōt. See BELGOROD.

Biélo-ozero, byěl-ō-ō'za-rō ("white lake"), a lake of European Russia, in the government of Novgorod, whose outflow is carried by the Cheksna River to the Volga. It is of a somewhat circular form, and has an area of about 430 square miles. A system of canals connects it with Lake Onega, the Dwina, and other rivers, and fishing is carried on in it.

Bielowski, byē-lōw'ske, **Augustus**, Polish poet: b. Krechowice, Galicia, 1806; d. 1876. Among his poetical compositions is to be mentioned the historical rhapsody, 'Lay of Henry the Pious.' He wrote a 'Critical Introduction to the History of Poland' (1850), but his principal work was the publication of 'Monumenta Polonise Vetustissima' (1864-72); a collection of Polish chronicles up to the time of Duigoz, since his death continued by the Cracow Academy of Sciences.

Bielshöhle, bēlz'hel-ě, a stalactite cavern in the Bielstien Mountain Harz, on the right bank of the Bode. It was discovered about 1672, but first made accessible in 1788. Its entrance is 108 feet above the bed of the stream; and its total length is 230 yards.

Bielski, byěl'ske, **Marcin**, Polish historian: b. Biala, near Sieradz, 1495; d. there, 1575. His 'Kronika swiata' and 'Kronika Polska' (1550 and 1564), contain the first comprehensive attempt at a history of Poland. He wrote two satirical poems, 'Sen majowy' (1590), and 'Seym niewiesci' (1595), picturing, in the one, the degradation of Hungary, and calling upon his countrymen to exhibit a nobler spirit than the Hungarians, while the other gives a keen analysis of the condition of Poland in his days. A strategical work of his, 'Sprawa rycerska' (1569), gives valuable information upon the condition of the Polish army, and the character of Polish tactics. After serving in the army, and taking part, in 1531, in the battle of Obertyn, he devoted himself for the rest of his days to literary pursuits. In 1617 the bishop of Cracow interdicted his 'Chronicles,' as they were suspected to contain heterodox sentiments.

Bienne, byēn, **Lake of**, called in German, Bielersee, a Swiss lake about 10 miles long by 3 broad, with a depth of 30 fathoms. Its scenery is more beautiful than bold. Being eight feet below the level of Lake Neuchâtel, it receives its waters by the Thiel and discharges itself into the Aar. On the islet of St. Pierre, in this lake, J. J. Rousseau resided for two months in 1765. That the lake was a centre of population from remote times, the remains of numerous pile-dwellings prove. At the northern extremity of the lake is the town of **BRENNE**, superbly seated at the foot of the Jura, surrounded by ancient walls with watch towers at intervals. It is a busy manufacturing place, its industries including watch-making, cotton-spinning, tanning, dyeing, book-binding, etc. A railroad connects it with Nidau and Boujean and cable roads ascend the mountains near by. The town contains among other institutions, the Wert Swiss Technical Institute, with its school for railroad employees. and a watchmakers' school. Pop. (1900) 22,100.

Biennials, in botany, plants which do not produce flowers and fruit during the first year of growth, but store up a stock of nourishment in a thickened stem or root, whence they draw the material for the growth of the second year, dur-

ing which flowers and fruits are developed and the plant dies. Several of our commonest food-plants, such as turnip, cabbage, and carrot, are biennials. Under special circumstances, favorable to rapid growth, a plant, ordinarily biennial, may become an annual.

Bienteveo, byān-tā-vā'ō, a flycatcher of southern South America, related to our kingbird and familiar about the villages and gardens of the Argentine Republic. Its name comes from its loud and cheerful cry, which resembles the Spanish phrase *Bien te Veo*, "I see you well." Unlike its relatives elsewhere, it erects a domed nest of so elaborate a construction that it sometimes takes weeks of work to build it.

Bienville, Jean Baptiste le Moyne, byāñ-vel, zhōn baptist le mwan (SIEUR DE), French colonist: b. Montreal, 23 Feb. 1680; d. 1765. In 1698, with his brother, Iberville, he left France to found a colony at the mouth of the Mississippi. In 1700 he constructed a fort 54 miles above the mouth of the river, and in 1701, at the death of Sauvolle, a second brother, he succeeded to the direction of the colony, the seat of which became Mobile. In 1718 he received a commission as governor of Mississippi, and about this time founded the city of New Orleans. In 1724 he was summoned to France, and, on 9 Aug 1726, was removed from office. In 1733 he was sent back to the colony as governor, with the rank of lieutenant-general. In 1743 he was again removed and returned to France, where he died.

Bierbaum, bēr'bowm, **Otto Julius**, German poet. b. Grunenberg, Silesia, 28 June 1865. He is a rising man of letters; his 'Songs of Experience' (or 'Poems That Were Lived') (1892), is as yet his most noteworthy volume. Other works of his are 'Studentenbeichten' (1897); 'Der sunte Vogel von 1807 und 1899'; 'Ein Kalenderbuch' (1896 and 1898).

Bierce, **Ambrose**, American author and journalist. b. Meigs County, Ohio, 24 June 1842. He served in the Civil War as a lieutenant of volunteers, and was brevetted major for gallantry. In 1866 he went to California and for 30 years was closely identified with Californian journalism. He edited the 'Argonaut,' and the 'Wasp,' and was a constant contributor to the 'Overland Monthly,' and San Francisco *Examiner*. His publications are 'Cobwebs From an Empty Skull' (1874); 'Black Beetles in Amber' (1892); 'Can Such Things Be?' (1893); 'In the Midst of Life' (1898). His most popular work was originally published at San Francisco (1891), under the title of 'Tales of Soldiers and Civilians'; 'Fantastic Fables' (1899); in collaboration with G. A. Danziger, 'The Monk and the Hangman's Daughter' (1892).

Bierman, Karl Eduard, bēr'man, karl ēd'-oo-ārd, German painter: b. Berlin, 26 July, 1803; d. 16 June 1892. He first took up painting on china and decorative painting, then turned his attention to landscape painting, studying in Switzerland and Italy. He is one of the founders of the Berlin School of Landscape Painting. Perhaps his best-known work is 'Evening in the High Alps'; others are 'View of Florence,' 'Isle of Philæ,' and the 'Temple of Edfu.'

Biernatzki, Johann Christoph, be-ēr-nāts'-ke, yō'hān kris'tōf, German pietist, poet, and story writer: b. Elmshorn. Holstein, 17 Oct.

BIERSTADT — BIG-HORN

1795; d. Friedrichstadt, 11 May 1840. A country pastor, he devoted himself to the versification of his own precepts and beliefs, the volume 'Faith' being the result. In 'The Brown Boy,' and 'Hallig, or the Adventures of Castaways on an Island in the North Sea,' he displays a not unpleasing capacity for prose narrative.

Bierstadt, bër'stat, Albert, American painter: b near Dusseldorf, Germany, 7 Jan. 1830; d. New York, 18 Feb. 1902. He removed with his parents to New Bedford, Mass., in 1831; began to paint in oils in 1851; and in 1853 returned to Dusseldorf to study his art, spending a winter in Rome, traveling in Italy and Switzerland, and returning to the United States in 1857. In 1859 he accompanied Gen. Lander's expedition to the Rocky Mountains, and spent several months in studies of mountain scenery. He was elected a member of the National Academy in 1860. In 1861 he finished his painting, 'Laramie Peak,' and in 1863 'View of the Rocky Mountains—Lander's Peak.' These at once gave him a national reputation. Among his many other paintings of American subjects are 'Valley of the Yosemite' (1866); 'El Capitan'; 'Looking Down the Yosemite' (1865); 'Great Trees of California' (1874); 'Geysers' (1883); 'On the Saco, New Hampshire' (1886); 'California Oaks' (1886). 'A Storm on the Matterhorn' is the best known of his Alpine subjects. Bierstadt received many foreign medals and decorations, and was a member of the National Academy of Design from 1860.

Biesbosch, bēs'bōs, a marshy sheet of water interspersed with islands, between the Dutch provinces of North Brabant and South Holland, formed in November 1421, by an inundation which destroyed 72 villages and 100,000 people, and spread over an area of 80 square miles.

Biester, João Ernesto, bē'stēr, zhō'own' er-nēs'tō, Portuguese dramatist: b. Lisbon, 1829; d. 1880. He wrote some 90 plays, the most noteworthy among them being 'The Nineteenth Century Gentleman,' 'Luck and Labor,' and 'The Scandal Mongers.' He founded the journal 'Revista Contemporanea de Portugal e Brazil' in 1859, and was its first editor. He was for many years the most popular dramatist in Portugal.

Biet, Antoine, byā, ān-twān, French missionary, who in 1652 accompanied 600 colonists to Cayenne, where he remained 18 months. He was the author of 'Voyage de la France Equinoxiale' (1664), with a Galibi dictionary at the end.

Bievre, Maréchal, be-āv, mā-rā-chal (MARQUIS DE), French writer: b. 1747; d. Spa, Germany, 1789. He served in the corps of the French musketeers, was a life-guard of the king of France, and acquired much reputation by his puns and repartees. After publishing several entertaining works, he composed (1783) 'Le Séducteur,' a comedy in verse, for the theatre, which has maintained its place on the stage, although it is bad both in plan and execution. *Mes amis*, he said, dying, *je m'en vais de ce pas (de Spa)*.

Bifrost, bē'frēst ("the trembling way"), in northern mythology the name of the bridge represented as stretching between Heaven and Earth (Asgard and Midgard); really the rainbow. It

was used only by the gods and was guarded by Heimdal.

Big Bend Country, a volcanic plain near the centre of the State of Washington. It covers 4,800 square miles, a third of it being gently rolling, brown loam prairie, suitable for farming, and the rest low hills and plateaus of bunch grass and sage brush, where live stock is ranged. The Columbia River curves round this region, bounding it on the north and west and partly on the southwest for 20 miles, and flowing in a ravine 1,500 feet below the general level. It is traversed by several remarkable chasms, many miles long, and from a furlong to half a league wide, with sheer walls of black basalt 500 feet high. There are a number of wheat farms in the region.

Big Bethel, Va., a village on the peninsula between the York and James rivers; where an unsuccessful attempt, directed by Gen. Butler, was made by Gen. Pierce, with four regiments, to dislodge outposts of Magruder's Confederate encampment at Yorktown, 10 June 1861. The Federal regiments, under Townsend and Bendix, *en route* for the Big Bethel camp, mistook each other for the enemy, and fired. This created great confusion. Pierce arrived and pushed on to the Confederate earthwork on Back River, destroying the camp at Little Bethel. The Federal troops crossed Back River and charged the earthwork, but were repulsed with considerable loss. Maj. Theodore Winthrop, the well-known novelist, losing his life on this occasion.

Big Black River, an affluent of the Mississippi, which it enters at Grand Gulf, Miss., after flowing about 200 miles, 50 of which are navigable. On 16 May 1863 a battle took place on this stream during Grant's pursuit of Pemberton toward Vicksburg. The Confederates were defeated, and lost heavily both in killed and captured. McClernand, swiftly following the retreating Confederates, came upon them drawn up on both sides of the Big Black River. McClernand led 10,000 Federals, Pemberton, 8,000 Confederates, his main command having gone on toward Vicksburg. McClernand began the fight. He was for a time unsuccessful, but Lawler, discovering a weak spot in the Confederate line, immediately took advantage of it and charged impetuously.

Big Bone Lick, a salt spring, in Boone County, Ky., 11 miles south of Burlington, where fossil remains of mastodons and other extinct fauna have been found. These animals are supposed to have resorted here to lick the salty earth in the vicinity of the spring.

Big-horn, the wild sheep of the mountains of western North America, so called on account of the massive, spiral horns of the ram, which resemble those of the Asiatic argoli. They originally ranged throughout the whole mountain system from New Mexico to northern Alaska, and as far down the valley of the Missouri River as the rough country extended. They are still to be found in the loftier and wilder parts of this territory, but remain numerous only about the head-waters of the Yellowstone, and thence northward. Their home is upon the loftiest parts of the ranges, where they find plentiful pasturage between the highest growth of timber, and the snow or ice of

BIG-HORN MOUNTAINS—BIGAMY

the summits; and upon the elevated and rocky plateaus of the Bad Lands of Dakota. In summer they wander about a good deal in small flocks, climbing to the highest points, where a wide out-look enables them to see quickly the approach of an enemy, and where they are least troubled by flies. In winter they are forced to descend somewhat, but rarely enter the forest, finding shelter against the storm in the mountain gorges, and sufficient dried grass upon the wind-swept ridges. Its principal enemy, in the old days, were the pumas and Indian hunters, whose constant pursuit taught it an alertness and wariness which now makes it one of the most difficult animals for the sportsman to approach. The speed, agility, and endurance of this mountaineer, are equal to that shown by any wild sheep or goat of the Alps or the Himalayas, and equally attacks the skill and patience of the hunter. Its horns therefore are highly valued as trophies, and its flesh is universally regarded as the best of all western game.

The common Rocky Mountain big-horn (*Ovis cervina*) is a strongly built sheep, standing about 40 inches high. In color, in its summer coat, it is tawny yellow, and in winter, grayish brown, with the face ashy, and a dark line along the spine. The under parts, and a conspicuous roundish patch on the buttocks, are whitish. The horns of the ram are of large circumference at the base, and thick and rugged, with a distinct keel at the outer edge; and sweep around backward into a spiral, which is complete in the largest specimens, and will measure 40 to 42 inches along the outer curve. A smaller and paler variety of Utah and Idaho, is called Nelson's big-horn. In the mountains of British Columbia is found Stone's big-horn, which is larger in size, and much darker in color (almost black, indeed), with comparatively slender horns. A third species, Dall's sheep, belonging to the mountains of central Alaska, is perfectly white, with horns of moderate size, and of a clear amber color. A fourth species, also Alaskan, may prove to be a variety of Dall's, which it resembles, except that a mantle of brownish-gray covers the body, as if a blanket were laid across its back. This last species has been named Fannin's sheep. All these sheep breed once a year, at the beginning of warm weather, usually producing two kids at a birth. They are hardly separable from the argalis of northeastern Asia, and doubtless all are descendants from the same primitive stock. See Mayer, 'Sport with Rod and Gun' (1892); Roosevelt, 'Hunting Trips of a Ranchman' (1883); Baillie-Grohman, 'Fifteen Years' Sport and Life in the Hunting Grounds of Western America' (1900). See also SHEEP.

Big-Horn Mountains, a range of mountains beginning near the centre of Wyoming and running north into Montana, containing heights of from 8,000 to 12,000 feet, and covering 7,500 square miles.

Big Horn River, a river of Montana and Wyoming. It rises in the Rocky Mountains near Fremont's Peak, and flows northeast into the Yellowstone. Along its course is some of the grandest mountain scenery in the world. It is navigable in its lower course, and has a total length of 400 miles. At its junction with the Little Big Horn is Fort Custer.

Big Jaw, or **Lumpy Jaw**. See ACTINOMYCOSIS.

Big Rapids, Mich., a city and county-seat of Mecosta County, on the Muskegon River, and several important railroads; 56 miles north of Grand Rapids. The river is here dammed in two places, providing a very valuable water-power. The city has the Holly system of waterworks, and an extensive trade in lumber and manufactures of furniture, sash, doors, and blinds, coiled elm hoops, shingles, etc. Among the noteworthy institutions is the Ferris Industrial School. There are daily and weekly newspapers, a private bank, several hotels, and a public library. Pop. (1900) 4,686.

Big Sandy River, a stream forming the boundary between West Virginia and Kentucky, and flowing into the Ohio; having two confluent forks, Tug Fork, that rises in West Virginia, and West Fork, that rises in Kentucky. It is navigable for 100 miles of its lower course and flows through a timber and coal region.

Big Sioux, soo, a stream of South Dakota, uniting with the Missouri near Sioux City, after a course of 285 miles.

Big Spring, Texas, town and county-seat of Howard County, 270 miles west of Fort Worth, on the Texas & P. R.R. It is of importance as a railroad town, the division shops and offices of the Texas & Pacific railroad being situated here. It carries on an active trade in live stock, hides, fruit, and agricultural products. Extensive deposits of salt are found underlying the region, and in the neighborhood is the great spring for which the town is named. Pop. (1900) 2,000.

Big Stone Lake, a body of water in Big Stone County, Minn., drained by the Minnesota River. It is about 25 miles long.

Big Trees. See SEQUOIA.

Big Woods, a wooded tract in the southeast part of Minnesota, extending south from St. Cloud to Le Sueur, where it crosses the Minnesota, and sends branches toward Fribault and Mankato. It is 100 miles long and from 10 to 40 miles wide, covering 5,000 square miles, four fifths of which lie north of the Minnesota. This great belt of hardwood timber is one of the most valuable forests in the West.

Bigamy, in the canon law, means being twice married; in the common acceptation of the word, as a term of ordinary law, it means the being married to two wives or husbands at the same time. The laws relating to plurality of wives or husbands might be supposed to come strictly under the head of polygamy; but, as it constitutes an offense against these laws to have more than one husband or wife, they are usually brought under that of bigamy. The laws of every civilized society make some provision respecting this subject. By the statute of 4 Edward I. stat. 3, cap. 5, the marrying of a second husband or wife, the first being alive, was made felony; and by that of 2 James I. cap. 11, this crime was made punishable by death. But the same statute provided that, where either party was absent beyond seas for seven years, whether known or not known to the other party to be alive, or was absent, though not beyond seas, for the same

BIGELOW

period, and not known by the other party to be alive, the other party was at liberty to marry again. Now, however, one of the parties is not held guiltless unless the other was absent continuously for seven years, and was not known to be alive. The penalty has been lessened by subsequent enactments, and the guilty party is now liable to penal servitude for seven years, or not less than five; or to be imprisoned with or without hard labor for not more than two. Every person aiding or abetting the bigamist is held to be equally guilty, and may receive the same punishment. By a Scottish statute of 1551 bigamy was made punishable as perjury—that is, with confiscation of goods, imprisonment and infamy; now, imprisonment is the usual sentence, but in some cases penal servitude is inflicted. If the accused had reasonable ground for believing the first spouse dead, he is not guilty of the crime; and if the first marriage was void for any reason, or dissolved by divorce, the second is not bigamous. In Scotch law, too, it is not necessary that either marriage should be regular for bigamy to be committed. The statute of James I has been adopted in most of the United States as to the description of the crime; but the State laws generally differ from it as to the penalty, having assigned, heretofore, instead of death, as provided by the English statute, the punishment of imprisonment and hard labor for a number of years, according to the discretion of the court, others leaving it to the verdict of the jury to fix the period of imprisonment.

The New York statutes against bigamy are substantially similar to those in nearly all the States of the Union. These statutes provide that any person who having a husband or wife living, marries another person, is guilty of bigamy, and is punishable in State's prison or a penitentiary for not more than five years. The statute does not extend to a person whose former husband and wife has been absent for five years successively, without being known to him or her within that time to be living, and believed by him or her to be dead; or to a person whose former marriage has been pronounced void, or annulled or dissolved, by the judgment of a court of competent jurisdiction, for a cause other than his or her adultery or to a person who being divorced for his or her adultery, has received from the court which pronounced the divorce, permission to marry again; or to a person whose former husband or wife has been sentenced to imprisonment for life. A person who knowingly enters into a marriage with another which is prohibited to the latter by the statute is punishable by imprisonment for not more than five years, or by a fine of not more than \$1,000, or both.

Bigelow, Edith Evelyn (JAFFRAY), American novelist: b. New York, 23 Dec. 1861; married Poultney Bigelow (q.v.) 1884. She has published 'Diplomatic Enchantments' and several novelettes.

Bigelow, Edward Fuller, American scientist: b. Colchester, Conn., 14 Jan. 1860. He was editor of 'Popular Science' for three years, and of 'The Observer,' a nature magazine, for eight years, and has lectured much on nature themes for the New York Board of Education and in

private and other schools. He has published 'Bigelow's Plant Analysis.'

Bigelow, Erastus Brigham, American inventor: b. Boylston, Mass., 2 April 1814; d. Boston, 6 Dec. 1879. He became a leading manufacturer in Clinton, Mass.; invented looms for suspender-weaving, for counterpanes, for coach lace, and for carpets; and published a textbook on shorthand writing; 'The Tariff Question' (1862), and other works.

Bigelow, Frank Hagar, American clergyman and meteorologist: b. Concord, Mass., 28 Aug. 1851. He graduated at Harvard in 1873, and at the Episcopal Theological School at Cambridge, Mass.; was ordained in 1880, and became assistant rector at St. John's Church, Washington, D. C. In 1873-6 and 1881-3 he was astronomer at the Cordova Observatory, Argentine Republic; in 1884-9, professor of mathematics at Racine College, Wisconsin; in 1893 became professor of meteorology in the United States Weather Bureau, and in 1894, professor of solar physics at Columbian University, Washington, D. C. He has written many articles on solar and terrestrial magnetism, astronomy, and meteorology. His most important contribution to astronomy is a monograph on the solar corona, published by the Smithsonian Institution in 1889.

Bigelow, Jacob, American physician: b. Sudbury, Mass., 27 Feb. 1787; d. Boston, 10 Jan. 1879. He graduated at Harvard College in 1806, and began medical practice in Boston in 1810. He early became known as a botanist, and a number of plants were named for him by Sir J. E. Smith, in the supplement to 'Rees's Cyclopædia,' by Schrader, in Germany, and De Candolle in France. He founded Mount Auburn Cemetery, in Cambridge, the first garden cemetery established in the United States. He was professor of materia medica in Harvard College in 1815-55, and Rumford professor there in 1816-27. His works include 'Useful Arts Considered in Connection with the Applications of Science' (1840); 'Florula Bostoniensis' (1824); 'American Medical Botany' (1817-20); 'Nature in Disease' (1854); 'A Brief Exposition of Rational Medicine,' 'The Paradise of Doctors, a Fable' (1858); 'History of Mount Auburn' (1860); 'Modern Inquiries,' and 'Remarks on Classical Studies' (1867).

Bigelow, John, American author: b. Malden, N. Y., 25 Nov. 1817. He graduated at Union College in 1835, and became first a lawyer and afterward a journalist. In 1845-6 he was inspector of Sing Sing prison; in 1849-61 one of the editors of the New York *Evening Post*; in 1861-4, United States consul-general at Paris; and in 1864-7, minister to France. He was secretary of state of New York 1875-7. In his will Samuel J. Tilden appointed him his biographer and one of the three trustees of the bulk of his estate set apart for the establishment of a public library in New York. On 22 Feb. 1895 a joint committee, representing the Tilden Trust Fund and the Astor and Lenox libraries, agreed on a plan for the consolidation of those interests and the establishment of a great public library to be known as the New York Public Library, Astor, Lenox, and Tilden Foundations. The agreement was ratified by the several interests, an act of incorporation was obtained from the legislature, and on 27

BIGELOW — BIGGE

May Mr. Bigelow was elected president of the consolidated board of trustees, and appointed chairman of the executive committee. His works include 'Molinos the Quetist'; 'France and the Confederate Navy'; 'Life of William Cullen Bryant'; 'Life of Samuel J. Tilden'; 'Some Recollections of Édouard Laboulaye'; 'The Mystery of Sleep'; 'A Life of Franklin.' In 1885 he published 'The Writings and Speeches of Samuel J. Tilden,' and in 1888, 'The Complete Works of Benjamin Franklin.'

Bigelow, John, Jr., American military officer, son of the preceding: b. New York, 12 May 1854. He was educated in Paris, Bonn, Berlin, Freiburg, and Providence, R. I.; graduated at the United States Military Academy in 1877; and was assigned to the 10th United States Cavalry. In 1887-9 was adjutant-general of militia in the District of Columbia; and in 1894-8, professor of military science at the Massachusetts Institute of Technology. During the war with Spain he was wounded in the attack on San Juan, Cuba, 1 July 1898. He published 'Principles of Strategy, Illustrated Mainly from American Campaigns' (rev. ed., 1894).

Bigelow, Marshall Train, American printer and proof-reader: b. South Natick, Mass., 5 Oct. 1822; d. Cambridge, Mass., 28 Dec. 1902. In 1843 he became associated with the University Press in Cambridge, the firm name of which from 1859 to 1879, was Welch, Bigelow & Company. He was long classed as one of the most competent of American proof-readers. He published 'Punctuation and Other Typographic Matters' (1881); 'Mistakes in Writing English and How to Avoid Them' (1886).

Bigelow, Melville Madison, American lawyer: b. Eaton Rapids, Mich., 2 Aug. 1846. He graduated at the University of Michigan in 1866, and engaged in practice in Boston. His works include 'The Laws of Bills, Notes, and Checks'; 'English Procedure in the Norman Period'; 'The Law of Fraud on Its Civil Side'; 'Elements of Equity'; 'Elements of the Law of Torts'; 'Placita Anglo-Normannia'; 'The Law of Wills'; 'The Law of Estoppel'; 'Leading Cases in the Law of Torts,' etc.

Bigelow, Poultney, American author: b. New York (son of John Bigelow), 10 Sept. 1855. He graduated at Yale University, and at the Columbia Law School in 1882, and was admitted to the bar. In 1875-6 he took a voyage around the world in a sailing-ship which was wrecked on the coast of Japan. He traveled in China, Africa, the West Indies, and Demerara. He has made canoe voyages on the principal waters of Europe, and was the first person to take a canoe through the Iron Gates of the Danube. Emperor William II. has been his personal friend since they were students together in Germany. He wrote 'The German Emperor and His Neighbors'; 'Paddles and Politics Down the Danube'; 'The Borderland of Czar and Kaiser'; 'History of the German Struggle for Liberty'; 'White Man's Africa,' etc. He edited the 'Outing' magazine, 1885-7, and has also been correspondent of 'Harper's Weekly' and the London *Times*.

Bigelow, Robert Payne, American biologist: b. Baldwinville, N. Y., 10 July 1863. He graduated at Harvard in 1887, and studied at

Johns Hopkins 1891-3. In 1893 he became instructor in biology, and in 1895 librarian in the Massachusetts Institute of Technology. He has written a number of papers on zoological subjects.

Bigelow, Timothy, American military officer: b. Worcester, Mass., 12 Aug. 1739; d. there, 31 March 1790. On 23 May 1775 he led a company of minute-men to Cambridge, and became major in Ward's regiment. He was under Arnold in the expedition to Quebec in 1775, and was there captured, remaining a prisoner till 1776. He became colonel in 1777, and assisted in the capture of Burgoyne. He also saw service at Valley Forge, Monmouth, West Point, and Yorktown.

Bigelow, Timothy, American lawyer (son of the preceding): b. Worcester, Mass., 30 April 1767; d. 18 May 1821. He graduated at Harvard College in 1786, was admitted to the bar, and settled in practice at Groton, Mass., in 1789. He took an active part in politics as a Federalist, was for 20 years a member of the State legislature, and 11 years speaker of the House of Representatives, and a member of the Hartford Convention. In 1807 he removed to Medford, and kept an office in Boston. His legal standing and practice were at the head of his profession in his time; and in the course of 32 years, he was supposed to have argued 10,000 causes.

Biggar, Hamilton Fisk, Canadian physician: b. Oakville, Ont., 15 March 1830. He was educated at Victoria University, and pursued his medical studies at the University of Medicine and Surgery, Cleveland, Ohio. In 1866 he began practice in Cleveland, and in 1867 was made professor of anatomy and clinical surgery in the Homœopathic Hospital College there. Later he was for 10 years professor of clinical surgery, with operations in the same college. In 1900 he held the chair of surgical diseases of women and clinical surgery. Dr. Biggar founded the Cleveland Training School for Nurses, where he was dean for 10 years. He wrote 'Twelve Months of Surgery'; 'Loiterings in Europe,' etc.

Biggar, Joseph Gillis, Irish politician: b. Belfast, 1828; d. London, 19 Feb. 1890. He succeeded his father in mercantile business in 1861; entered politics in 1869; and was elected to Parliament for county Cavan in 1874. He was a member of the Supreme Council of the Irish Republican Brotherhood. When Charles Stewart Parnell entered Parliament in 1875 Biggar ranged himself on the side of that leader. He took an active part in the Land League movement. In 1877 he was expelled from the Fenian organization, and in 1880 delivered aggressive speeches in Ireland. He was one of the few prominent Irish members who were never in prison.

Bigge, big, Sir Arthur John, English soldier: b. Stamfordham, 18 June 1849. He entered the Royal Artillery in 1869; served in the Zulu war, 1878-9, with distinction, and in 1879 was appointed aide-de-camp to Maj.-Gen. Sir Evelyn Wood. In 1880 he became groom-in-waiting to the queen and assistant private secretary; in 1881 equerry in ordinary, and in 1895, private secretary and equerry to the queen.

BIGGS—BIJAPUR

Biggs, Asa, American jurist: b. Williams-ton, N. C., 4 Feb. 1811; d. Norfolk, Va., 6 March 1878. He received an academical education, and was admitted to the bar in 1831. He was a member of the North Carolina Constitutional Convention in 1835; was elected to the State legislature in 1840, 1842, and 1844; was a member of the commission appointed to revise the State statutes in 1850, and was again sent to the legislature in 1854. In 1854 he was elected United States senator; resigned in 1858, and was appointed judge of the United States District Court of North Carolina.

Biglow, William, American educator and poet: b. Natick, Mass., 22 Sept. 1773; d. Boston, 12 Jan. 1844. He was first established as a teacher in Salem, and in 1799 delivered a poem on education before the Phi Beta Kappa Society at Cambridge. He then took charge of the Latin School, Boston, preaching occasionally, writing for different periodicals, and publishing educational text-books. Here he fell a victim to intemperate habits and was compelled to retire to his home in Natick. In this state of his fortunes it was his habit to lounge about the newspaper offices at Boston, write poetry for his friends, the editors, while the humor lasted, and then return to his rural retreat. He taught, also, a village school in Maine, and in the latter part of his life was employed as a proof-reader in the university printing office at Cambridge. He had a genial and pleasant humor, and was a ready versifier, as well as an agreeable prose-writer. His 'Cheerful Parson' and others of his songs, were much admired by his contemporaries and are well worthy of remembrance. He also published, in 1830, a 'History of the Town of Natick,' and one of Sherburne, Mass. But his best and most numerous writings were in periodicals, the 'Village Messenger,' of Amherst, N. H., which he edited in 1796, the 'Federal Orrery,' and 'Massachusetts Magazine.'

Biglow Papers, two series of satirical poems written by James Russell Lowell, the first appearing in 1848, the second in 1866. They were written in "Yankee" (New England) dialect, and attracted much attention by their humor. The first series was directed against the Mexican war and slavery; the second dealt with the Civil War.

Bignon, Louis Pierre Edouard, bèn-yōñ, loo-ê pē-ār ā-doo-ar, French historian and statesman: b. La Meilleraye, 3 Jan. 1771; d. Paris, 5 Jan. 1841. He entered the National Assembly in 1817; became a peer of France in 1837, and wrote a 'History of France' (7 vols., 1827-38). He received from Napoleon I. a bequest of \$20,000.

Bigno'nia, the type-genus of the natural order *Bignoniaceæ*, consisting of more than 100 species of mostly South American tropical climbing shrubs, many of which are raised in green-houses for their ornamental foliage and handsome tubular flowers of various colors. Some species are used as cordage in South America and are said to be employed in making mats, baskets, etc. The cultivated species are generally of easy management if given good soil, plenty of light, and space for both roots and tops. *B. capreolata*, which has numerous orange-red flowers, is a common climber through-

out the South and as far north as Maryland. In favorable soils and situations it often attains heights exceeding 50 feet. It is known as "trumpet-flower" from the shape of its blossoms, and "cross-vine" and "quarter-vine" from the appearance of the cross-section of its stem. It is sometimes confounded with its near relative, *Tecoma radicans*, trumpet-vine (q.v.).

Bigordi, Domenico, bē-gōr-dē, dō-mēn-ē-kō, Italian painter: b. Florence, 1449; d. Florence, 11 Jan. 1494. He was nicknamed GHIRLANDAJO; teacher for a time of Michael Angelo and Granacci; founder of a new school of painting; painted chiefly sacred subjects; and executed notable frescoes in Rome, Florence, and other cities. His 'Adoration of the Magi,' a panel in the Church of the Innocents, and the 'Annunciation,' on a cathedral entrance in Florence, are among his best works.

Bihacs, or Bihatch, bē-hāčh', a fortress of Bosnia, on an island of the Unna, about 50 miles east of the Adriatic. It has a low and unhealthy site, but is remarkable for its strength. The possession of it has often been keenly contested during the Turkish wars.

Bihé, bē-hā', South Africa, a fruitful district lying east of Benguela, and under Portuguese influence. It is an important caravan centre, as the only route across the Continent passes through it. Area, 3,900 square miles. Pop. 95,000.

Bijanapur, bē-jā-na-goor', or Vijayanagara, otherwise HAMPI, India, an ancient city, now in ruins, in Bellary district, Madras, 30 miles northwest of Bellary. It stands in a plain, surrounded by enormous masses of granite, and covers an area nearly eight miles in circuit. On the north and west it is washed by the Tungabhadra, and in other directions is enclosed partly by natural precipices and partly by strong stone walls. Among its edifices are a magnificent temple of Vishnu, with a pyramidal portico about 160 feet high, divided into 10 stories; another temple, also entered through a painted pyramidal portico; and one of Rama, with pillars of black hornblende covered over with elaborate mythological sculptures. These buildings, and many others besides, are in the purest style of Hindu architecture. Its ruin was effected by a confederation of Mohammedan rajahs, who took and sacked it in 1564.

Bijapur, bē-jē-por', India, a decayed city in the Bombay presidency, 160 miles southeast of Poona. It was for centuries the flourishing capital of a powerful kingdom, but fell therewith under various dynasties in succession, Hindu and Mussulman, till in 1686 it was captured by Aurungzebe. It passed, during the early part of the 18th century, into the hands of the Mah-rattas, and became British in 1848. Now that a gradual decay has done its worst, Bijapur presents a contrast perhaps unequaled in the world. Lofty walls of hewn stone, still entire, enclose the silent and desolate fragments of a once vast and populous city. With the exception of an ancient temple, the sole relic of aboriginal domination, the ruins are Mohammedan, and consist of beautiful mosques, colossal tombs, a fort, with an inner citadel, a mile in circuit. The British government has done everything to prevent further decay.

Bijns, bīnz, Anna, Flemish poet: b. Antwerp, 1494, d. there, 10 April 1575. Much admired for her melodious verses, full of metaphors and showing great technical skill, she was styled the "Brabantine Sappho" by her contemporaries. The first of her volumes of collected verse bore the title 'This Is a Beautiful and Truthful (or Sincere) Little Book,' while a second is known as 'Spiritual Refrains.'

Bikanir, bē-ka-nēr', India, a native state of Rājputāna, under the superintendence of a political agent and the governor-general's agent for Rājputāna, lying between lat 27° 12' and 30° 12' N. and lon. 72° 15' and 73° 50' E; area, 23,173 square miles; pop. 831,955. In the whole country there is not a constant stream, the main dependence of the people being on wells of poor brackish water which is drawn from depths of 250 feet and upward, yet large flocks of sheep are kept. The country is subject to extremes of temperature in each 24 hours.

Bikanir, India, capital of the above state, an irregularly built city surrounded by a fine wall three and a half miles in circuit. It has a fort, containing the rajah's palace, and manufactures blankets, sugar candy, pottery, etc. Pop. including suburbs, 56,252.

Bikelas, Dimitrios, bē-kā'las, dē-mē'trē-ōs, Greek poet and essayist: b. Hemopolis, island of Syra, 1835. After completing his studies he went to London, where his parents had settled, and since 1874 he has lived in Paris. After having published a collection of his poems in London in 1862, he devoted himself to the task of making Shakespeare's dramas known in Greece through excellent metrical translations. As a prose-writer he has won wide reputation with his tale, 'Lukis Laras' (1879), which was translated into 13 languages.

Bilbao, bēl-ba'o, Spain, capital of the province of Biscay (qv) or Bilbao, situated on the navigable Nervion, in a plain surrounded with high mountains, a few miles from the sea. The river is crossed by four bridges. The town is picturesque, and well built, and contains several good churches, two fine promenades, a theatre, a marine school, etc. Bilbao carries on an important trade and manufactures (the latter consisting chiefly of sailcloth, ropes, and leather), and possesses large shipyards and iron-foundries, iron and steel works, etc. It is one of the most flourishing seaports of Spain, though its accommodation for shipping is defective, and it is the seat of a United States consul. Various harbor improvements, however, have recently been carried out, including a breakwater and mole. Bilbao exports much iron ore (especially to the United Kingdom), also pig-iron, wool, wine, etc.; the imports are manufactured goods, dried fish, timber, coal, etc. Its supply of water and sanitary arrangements are not good. Pop. (1896) 66,205.

Bil'berry. See HUCKLEBERRY.

Bil'bilis, Spain, an old Iberian city, two miles east of the modern town of Calatayud, in the province of Saragossa, chiefly celebrated as the birthplace of the poet Martial, but also famed for its highly tempered steel blades.

Bilderdyk, bīl'der-dik, William, Dutch poet: b. Amsterdam, 7 Sept 1756; d. Haarlem, 18 Dec 1831. He studied at Leyden, and in 1776 obtained from the learned society of Leyden

the first prize for a poem on the influence of poetry upon governments. In 1780 he obtained another prize for a poem on the connection of poetry and eloquence with philosophy. Bilderdyk, besides, devoted himself to law, at The Hague, with great success. On the invasion of the Netherlands by the French he left his country and removed to Brunswick, where he studied the German language and poetry, and afterward to London, where he delivered, in French, lectures on literature and poetry. In 1799, after the new order of things was firmly established in Holland he returned, and soon afterward published some of his principal works. Among these are a didactic poem on astronomy, and masterly imitations of Delille's 'L'Homme des Champs,' and Pope's 'Essay on Man.' Louis Bonaparte, on his accession to the throne, appointed him his teacher of Dutch, and one of the first members of the national institute founded by him. Bilderdyk produced a number of war-songs, which are considered to be among the best in Dutch poetry.

Bile, the most important secretion of the liver. It is formed directly by the liver cells, largely from the blood, is collected by the bile ducts, and discharged through the hepatic ducts. Most of the bile is stored in the gall-bladder, from which it is discharged in man by the cystic duct and the common duct into the upper portion of the duodenum, four inches below the lower end of the stomach. As first secreted in man it is a clear limpid fluid, but in the gall-bladder it is mixed with mucin and becomes darker, varying from dark brown to greenish, according to the amount of oxidation of the bile pigments. The bile of the carnivora is usually yellowish in tint, that of the grass-eaters greenish, but the colors vary widely, dependent on the oxidation. Bile is an alkaline fluid with a bitter taste, and contains water, alkaline salts of bile acids, bile pigments, traces of lecithin, cholesterolin, soaps and fats, and mineral salts. The proportions of these are very variable. The acids are known as glycocholic acid, yielding glycocholl and cholalic acid, and taurocholic acid, yielding taurine and cholalic acid. The pigments are two, bilirubin and biliverdin, and the color is a compound of the colors of these two and varies with the proportion of each from reddish-brown to grass-green. They are thought to be derived from the hemoglobin of the blood. The functions of bile are not clearly understood, but it seems to aid in the digestion of fats; it is an important organ of excretion, getting rid of many broken down products of metabolism, notably the cholestrin and lecithin. It is an efficient antiseptic, reducing the amount of excessive fermentation in the intestines, it aids in peristalsis and thus overcomes constipation, and perhaps has other functions connected with proteid digestion. The amount of bile secreted daily varies from 25 to 50 ounces, its secretion is more or less uniform, but at the digestive periods the stored bile of the gall-bladder is added to the intestinal contents. Gall-stones result from concentration of the bile in the gall-bladder. They are also formed as a process of infection of the gall-bladder that creeps up from the duodenum. Gall-stones following typhoid fever are very common, and are probably formed in this manner. As a result of inflammation of the stomach and duodenum the common duct sometimes is inflamed and its walls

BILFINGER — BILL

swollen. This prevents the escape of bile into the intestines and the bile pigments are taken up by the blood and cause the familiar symptom of jaundice (q.v.). Biliousness, so called, is rarely an affection of the liver, but much more often a mild inflammation of the stomach and intestines with catarrhal obstruction of the common duct that is not severe enough to dam back the bile entirely. Clayey stools are usually indicative of deficient bile-elimination. The best-known stimulants of bile-formation and bile-elimination are heat and the biliary acids themselves. The vast majority of the numberless patent liver-pills on the market have no influence on the liver whatever; they are simply cathartics and empty the bowels. Consult Schaefer, 'Physiology' (1898). See DIGESTION; GLYCOGEN; JAUNDICE; LIVER.

Bilfinger, Georg (gā-orh') **Bernhard**, German philosopher and mathematician. b. Gernstadt, Wurtemberg, 23 Jan. 1693; d. Stuttgart, 18 Feb. 1750. He was born with 12 fingers and 12 toes, and submitted to an operation which removed the deformity. He studied with Wolf at Halle and became a disciple of the school of Wolf and Leibnitz. In 1725 he received an invitation from Peter the Great to the chair of logic and metaphysics in the new college at St. Petersburg. He now solved the problem of the cause of gravity proposed by the Academy of Sciences at Paris, and gained the prize. Being recalled by Duke Charles Edward of Wurtemberg he returned to Tübingen and proceeded to lecture on theology; here his originality in style and ideas soon made him popular, and in 1735 he was appointed a privy counselor. Here he displayed great administrative ability, and by severe study soon became as celebrated for his political and statistical knowledge as for his scientific attainments. He afterward paid particular attention to agriculture and promoted the culture of the vine. He was the author of numerous theological and philosophical works.

Bilguer, Paul Rudolf von, bil'gwer, powl roo-döf fön, German chess-player: b. Schwerin, 1808, d. Berlin, 6 Oct. 1840. He entered the Prussian army in 1833, and shortly afterward was promoted lieutenant. On 18 March 1840 he performed at Berlin the curious feat of playing three games at once with as many different opponents, conducting two of the contests without seeing the boards and men. This intense mental effort is supposed to have been the primary cause of the illness which resulted in his death. His 'Chess Handbook' (Berlin, 1843 and 1852), completed after his death by his friend T. Heydebrandt von der Lasa, made an epoch in the history of chess, and is still the best practical work on that game.

Bilharzia, a parasitic worm, *Bilharzia hematobium*, very common in Egypt and South Africa, but rare in the United States. The symptoms are usually those of cystitis, or inflammation of the bladder, with bloody urine. The diagnosis is usually made by finding the ova of the worm in the blood, by the microscope. See PARASITES.

Bilim'bi. See BLIMBING.

Bilin, bē-lēn', Bohemia, a town and health resort seven miles south-southwest of Teplitz. It contains a fine old castle built in 1680, and one of more modern date; several churches,

chapels, mills, etc. Within one mile of the town are much-frequented mineral springs, from which much water is exported. The salts and magnesia obtained from the water form important articles of commerce. It is an alkaline water, and is used with advantage in certain concretionary disorders. Here is also the singular basaltic rock called Bilner Stein. Pop (1900) 7,808.

Bilious Fever, an old name given to a variety of conditions, but in all of which there was characteristic low-grade fever associated with a certain amount of jaundice, clayey stools, headache, foul tongue, etc. It probably represents no one disease, but a complication of many diseases. See BILIOUSNESS; GASTRITIS; INFLUENZA; MALARIA; TYPHOID FEVER.

Bill, or **BEAK**. See **BEAK**.

Biliousness, a popular term to express some affection of the liver, but in all probability a condition of disturbed gastric and duodenal digestion, and having nothing whatever to do with the liver. In the article on bile (q.v.) the passage of this liver secretion into the hepatic duct and storage in the gall-bladder and subsequent emptying into the duodenum, is described. When the stomach is inflamed, this usually extends a certain distance into the intestines and as a consequence the mucous membrane of the common ducts also becomes inflamed and swollen. This prevents the free passage of bile into the intestines and therefore its important function in digestion is stopped or diminished. This results in further indigestion, and causes constipation, and increased putrefaction of the intestinal contents results. Thus there is a chain of many links formed that results in headache, heaviness, bloating, constipation, foul tongue, foul breath, dark urine, and in severe cases mild jaundice. The entire series may have been set in motion by over-eating, or drinking alcoholic liquors, or deficient exercise, eating excessively of fatty (so-called rich) food, or other hygienic misbehavior. Any or all have started the mild inflammation of the stomach or intestines, and the biliary flow has been diminished. The trouble thus has nothing to do with the liver. The treatment should take into consideration the cause. Rest, careful dieting, plenty of water, some mild laxatives, heat over the pit of the stomach, and hot water enemas, will usually right the condition. The free washing of the bowels and the laxative will usually cure the symptoms of poisoning, headache, and heaviness. Dosing with patent pills and teas are to be condemned. They usually contain violent cathartics that irritate the stomach and intestines. While they empty the bowels and thus get rid of the poisoning symptoms, they leave behind or increase the conditions which permit of further trouble. See AUTO-INTOXICATION; BILE; CONSTIPATION; DIGESTION; LIVER.

Bill, **Brownbill**, **Glaive**, **Voulge**, or **Gisarme**, all names for nearly the same instrument, which, with some slight modification, was the standing weapon of the English infantry at close quarters, as was the long-bow their weapon at distant range, from the days of the battle of Hastings, at which the Saxons used the bill and the Normans the bow, until those of Queen Elizabeth. The original brownbill was a ponderous cutting weapon with two edges, that

BILL

forward of the shaft having a concave or sickle blade, that to the back, a sort of angular cutting face, the upper part projecting before the base, so as to give a drawing blow. This terrible instrument was nearly three feet long, and 10 or 12 pounds in weight, set erect on a shaft of three or four feet. It was wielded with both hands, and could sever a horse's head or a man's thigh or shoulder, through the strongest mail or plate armor, as a modern woodman's bill-hook slices off a hazel sapling. The weapon was afterward lengthened and lightened, and provided with a spear head, so that the holder could charge it like a lance, and sometimes with a cutting hook, for severing bridles or pulling men out of their saddles.

Also a cutting instrument, hook-shaped toward the point, or with a concave cutting edge; used by plumbers, basket-makers, gardeners, etc.; made in various forms and fitted with a handle. Such instruments, when used by gardeners for pruning hedges, trees, etc., are called hedge-bills or bill-hooks.

Bill, a paper, written or printed, giving a statement of the particulars of an account or action. A printed proclamation, an advertisement, an act of Congress or parliament, or a tradesman's account is a bill.

In Legislation.—A term used to signify a special act passed by the legislature in the exercise of a *quasi* judicial power. Thus, bills of attainder, bills of pains and penalties are spoken of. The draft of a law submitted to the consideration of a legislative body for its adoption or rejection. The Constitution of the United States provides that all bills for raising revenue must originate in the House of Representatives, but the Senate may propose or concur with amendments as on other bills. Every bill before it becomes a law must be approved by the President of the United States, or within 10 days returned, with his objections, to the House in which it originated. Two thirds of each House may then enact it into a law. These provisions are copied in the constitutions of a majority of the States.

Bill of Adventure.—A writing signed by a merchant, in which he states that certain goods shipped in his name really belong to another person, at whose risk the adventure is made.

Bill of Attainder.—A bill declaring that the person named in it is attainted and his property confiscated. The Constitution of the United States declares that no State shall pass any bill of attainder. During the Revolutionary War, bills of attainder and *ex post facto* acts of confiscation were passed to a wide extent. The evils resulting from them, in times of cooler reflection, were discovered to have far outweighed any imaginary good.

Bill of Costs.—A statement of the items which form the total amount of the costs of a suit or action. This is demandable as a matter of right before the payment of the costs.

Bill of Credit.—A letter sent by an agent or other person to a merchant, desiring him to give the bearer credit for goods or money. It is frequently given to one about to travel and empowers him to take up money from the foreign correspondents of the person from whom the bill or letter of credit was received.

Bill of Entry.—A written account of goods entered at the custom-house, whether imported or designed for exportation.

Bill of Exceptions.—A bill of the nature of an appeal from a judge who is held to have misstated the law, whether by ignorance, by inadvertence, or by design. Thus the judge is bound to seal if he be requested by the counsel on either side so to do. The exceptions noted are reviewed by the court to which appeal is taken, and if the objections made to the rulings of the trial judge are well founded, the finding in the case is reversed, and usually the cause is remanded for a new trial.

Bill of Exchange.—A bill or security originally introduced for enabling a merchant in one country to remit money to a correspondent in the other. It is an open letter of request from one man to another, desiring him to pay to a third party a specified sum and put it to the account of the first.

Bill of Health.—A certificate given to the master of a ship clearing out of a port in which contagious disease is epidemic, or is suspected to be so, certifying to the state of health of the crew and passengers on board.

Bill of Indictment.—A written accusation made against one or more persons having committed a specified crime or misdemeanor. It is preferred to and presented on oath by a grand jury. If the grand jury find the allegations unproved, they ignore the bill, giving as their verdict, "Not a true bill"; if, on the contrary, they consider the indictment proved, their verdict is a "True bill."

Bill of Lading.—A document by which the master of a ship acknowledges to have received on board his vessel, in good order and condition (or the reverse), certain specified goods consigned to him by some particular shipper, and binds himself to deliver them in similar condition,—unless the dangers of the sea, fire, or enemies prevent him,—to the assignees of the shipper at the point of destination, on their paying him the stipulated freight.

The bill of lading should contain the name of the shipper or consignor; the name of the consignee, the name of the vessel and her master; the places of shipment and destination; the price of the freight, and in the margin, the marks and numbers of the things shipped. It is usually made in three or more original parts, one of which is sent to the consignee with the goods, one or more others are sent to him by different conveyances, one is retained by the merchant or shipper, and one should be retained by the master. It is assignable by indorsement, and the assignee is entitled to the goods, subject to the shipper's right of stoppage *in transitu* in some cases, and to various liens. It is considered to partake of the character of a written contract, and also that of a receipt. In so far as it admits the character, quality, or condition of the goods at the time they were received by the carrier, it is a mere receipt, and the carrier may explain or contradict it by parol; but as respects the contract to carry and deliver, it is a contract, and must be construed according to its terms. 3 N Y 322; 6 Mass 422. Under the admiralty law of the United States, contracts of affreightment entered into with the master in good faith and within the apparent scope of his authority as master, bind the vessel to the merchandise for the performance of such contracts in respect to the property shipped on board, irrespective of the ownership of the vessel, and whether the master

be the agent of the general or special owner, but bills of lading for property not shipped, and designed to be instruments of fraud, create no lien on the interest of the general owner, although the special owner was the perpetrator of the fraud. Under a bill of lading in the ordinary form, having no stipulation that the goods shipped are to be carried on deck, there is a contract implied that the goods shall be carried under the deck, and parol evidence to the contrary will not be received. 14 Wend. 26. But evidence of a well-known and long-established usage is admissible, and will justify the carriage of goods in that manner.

Bill of Rights.—A bill which gave legal validity to the claim of rights, that is, the declaration presented by the Lords and Commons to the Prince and Princess of Orange on 13 Feb. 1688, and afterward enacted in Parliament when they became king and queen. It declared it illegal, without the sanction of Parliament, to suspend or dispense with laws, to erect commission courts, to levy money for the use of the Crown on pretense of prerogative, and to raise and maintain a standing army in the time of peace. It also declared that subjects have a right to petition the king, and, if Protestants, to carry arms for defense, also that members of Parliament ought to be freely elected and that their proceedings ought not to be impeached or questioned in any place out of Parliament. It further enacted that excessive bail ought not to be required, or excessive fines imposed, or unusual punishment inflicted, that juries should be chosen without partiality, that all grants and promises of fines or forfeitures before conviction are illegal, and, that, for redress of grievances and preserving of the laws, Parliament ought to be held frequently. Finally it provided for the settlement of the Crown. In the United States, a bill of rights, or, as it is more commonly termed in this country, a declaration of rights, is prefixed to the constitutions of most of the States. See UNITED STATES — STATE CONSTITUTIONS OF THE

Bill of Sale.—A deed of writing, under seal, designed to furnish evidence of the sale of personal property. It is necessary to have such an instrument when the sale of property is not to be immediately followed by its transference to the purchaser. It is used in the transfer of property in ships, in that of stock in trade, or the goodwill of a business. It is employed also in the sale of furniture, the removal of which from the house would call attention to the embarrassed circumstances of its owner; hence the statistics of the bills of sale act as an index to measure the amount of secret distress existing in times of commercial depression. In not a few cases bills of sale are used to defeat just claims against the nominal or real vendor of the goods transferred.

Bill of Sight.—A form of entry at the custom-house by which one can land for inspection, in presence of the officers, such goods as he has not had the opportunity of previously examining, and which, consequently, he cannot accurately describe.

Billaud-Varenne, Jacques-Nicolas, bē-yō-va-rēn, zhak-nē-kō-lar, French revolutionist: b. Rochelle, 23 April 1756; d. 3 June 1819. He was bred to the legal profession, and having come in 1785 to Paris, political events soon

began to occupy his attention, and in 1789 three treatises appeared from his pen, entitled respectively 'Despotisme des Ministres de France'; 'Dernier Coup Porté aux Préjugés et à la Superstition', and 'Le Peintre Politique'. Another publication, 'Acéphalocratie,' which appeared in 1791, subjected him to a judicial prosecution, and he was obliged to conceal himself for a time. He emerged from his retreat on the triumph of his party in September 1791, and in 1792 was elected a member of the National Convention. On the trial of the king he voted for execution within 24 hours. He contributed to the overthrow of the Girondists, and was subsequently chosen president of the convention, and member of the Committee of Public Safety, and in that capacity framed the Bulletin des Lois and assisted in organizing the revolutionary government. In 1795, on a reaction having taken place against the ultra party, he was arrested, and along with Collot d'Herbois, banished to Cayenne. On the overthrow of the directorate he refused the amnesty offered by Bonaparte. In 1816, on the restoration of Cayenne to France, he was obliged to take refuge at Port-au-Prince, in the island of St. Domingo. Here he died in poverty.

Billaut, Adam, bē-yō, a-dañ, or **Maitre Adam**, French poet: b. early part of the 17th century; d. 1662. A carpenter by trade, he wrote rude but original poems, the gaiety of which, together with the contrast they afforded with his occupation, made them very popular at the time. Voltaire called him "Vergil with the Plane." The three collections of his poems were entitled 'The Pegs'; 'The Centre-Bit'; and 'The Plane'.

Billbergia, a genus of about 40 species of evergreen epiphytes of the natural order Bromeliaceae, natives of South America and often cultivated in greenhouses for their showy flowers.

Bille, bē'le, Steen Andersen, Danish naval officer: b. Copenhagen, 5 Dec 1797, d. Copenhagen, 7 May 1883. He was a member of the expedition that went to South America in 1840, and had command of a scientific expedition round the world in the corvette Galatea, 1845-7. In his 'Beretning om Corvetten Galathea's Reise Omkring Jorden, 1845-6 og 47' (1849-51) he has given an account of this expedition.

Billet, the term given to a molding frequently introduced in mediæval architecture, consisting of a torus ornamented by alternate checkers, like a staff cut into short lengths and disposed horizontally or around a molding, and of another molding, composed of a series of small projections, arranged around a curve in alternate directions, but in a consecutive manner.

Billeting of Soldiers, the compulsory lodging of soldiers with the inhabitants of a town, formerly a frequent practice whenever there was a deficiency of accommodation in barracks or regular quarters. The billeting of soldiers on private householders is now abandoned generally, and billeting is reduced as much as possible by camping out and other arrangements. In the United States the practice is regulated by the third constitutional amendment.

Billfish, any of several fishes having notably long, beak-like snouts, as a gar, needle-fish, or spearfish (qq v.).

BILLIARDS

Billiards, the generic name of a group of games; is played in the United States usually on a 5x10 table, fitted on each side and at the ends with rubber acting as cushions. Ivory balls driven by a wooden cue and varying in size from 2 5-16 inches to 2 7-16 inches are generally used. The bed of the table is slate, from 1¼ to 1¾ of an inch in thickness, and covered, as is also the rubber, with green cloth. The body of the table and legs, and the rails, are made from various designs of wood.

The origin of the game of billiards is shrouded in mystery, but is known to have been played in a crude way since before the birth of Christ. It is mentioned in Shakespeare's 'Anthony and Cleopatra' (1607), and it is now generally agreed that the immortal bard, in his researches for facts, had read of billiards before the birth of our Saviour. Cathire More, a sub-king of Ireland, as early as 148 A.D., speaks of billiards and billiard balls of brass. In the Confessions of St. Augustine, born 430 A.D., mention is made of the game of billiards. From this time until the end of the 14th century very little is known of the game. It is mentioned in Spencer's 'Mother Hubbard Tales' (1591). About this time the French made it an indoor table game by playing it on a square table with pockets at each corner, and one in the center of each side, a little cone in the centre of the table called the "king," and an arch of ivory, known as the "port." Certain scores depended on passing the "port" and touching the "king." As early as 1734, as stated in Seymour's 'Court Gamester' these features of the game had disappeared, and cues had begun to replace the "mast" or "mace" first used. Billiards came into fashion in the time of Louis XIV., whose physicians recommended him this kind of exercise after eating. Some profess to believe the game of English origin, as the earliest and full-est description of billiards is found in Cotton's 'Complete Gamester' (1674). The bed of the table was then made of oak, sometimes marble. Slate beds were first used about 1827. The pockets of the tables at that time, called "hazards," were at first made of wooden boxes, nets being employed soon afterward.

The billiard table is said to have found its way into America through the Spaniards about 1570. At this time it was played in England, France, Germany, and other countries, but the size of the table and style of the game differed. The English style of table and game was first adopted by the Americans. Six by twelve, six-pocket tables and four balls (two reds and two whites) were used. Soon the tables were reduced in size from 6x12 to 5½x11, then to about 5 feet wide by 10 feet long. Tables vary in measurements. All match and tournament games are now played on 5x10 tables, and are very popular in all leading public rooms and clubs throughout the United States, while the so-called 4½x9 tables are almost exclusively used in private residences and in small cities and towns.

It is only in the last 50 years that billiard tables and their paraphernalia, and billiard playing itself, have made giant strides. Until the year 1855, when Michael Phelan, the father of billiards, first introduced the celebrated combination cushions, made of rubber chiefly, the tools were necessarily crude and imperfect, and greatly retarded the progress of the players up to that period. Then was played the four-ball

game on a 6x12, six-pocket table. Two red balls and two white balls were used. In the 'sixties the tables were reduced in size to 5½x11, but so fast did the professionals and amateurs improve their games under the improved condition of the table and tools, and in order to avoid the seeming monotony of long runs, it was found necessary to again reduce the size of the table, from pockets to carrom, to about 5 feet wide and 10 feet long, and change the style of game from four-ball to three-ball game. This was done early in the 'seventies. Experts soon became so proficient at this style of game as to render it necessary to place restrictions on the bed of the table by drawing lines first 8 inches, then 10, 12, 14, and finally 18 inches from the edge of the cushions the entire length and width of the table—called balk-line game. This method of restricting the professionals and leading amateurs in no wise does away with the beauties of the game, as the Massé, draw, follow, and combination cushion shots are left intact. The superb play of the professionals in this country and in France, where the same style of game is played, is due in a great measure to the improved construction of the beveled table, slabs, match rubber cushions, and to the ivory balls, cue, cue tips, and chalk.

Various are the styles of billiards played now, such as "three-cushion carroms," "cushion carroms," "champions' game," "balk-line game," and the regular three-ball game.

Pool may be said to be, broadly speaking, a branch of billiards, and is very popular with the masses. It lacks the skill and variety of billiards. Pool is played on a 5x10 or 4½x9, six-pocket table, and generally with gully attachments—a new device that rather adds to the popularity of the game. This gully is so placed under the table that all balls, when pocketed will drop into a basket at the foot of the table. The most popular of the various pool games is "continuous pool," played with 15 numbered balls and one plain white one—the cue ball. These 15 balls are arranged in a triangle form at the foot of the table. The player's object is to drive as many of the numbered balls successively into one or other of the pockets as he can, subject to certain rules and regulations. There are various other kinds of pool games—"American," "pyramid," "Chicago," "forty-one," and others. For a complete list of these various styles of games, also all styles of billiards, with the rules governing them, the reader is referred to the 'Handbook of Standard Rules of Billiards and Pool.' This handbook also gives valuable hints on the care of tables, balls, cues, etc.

One of the most important parts that go to make billiard playing complete is the cue and cue-tip. The size and weight of the cue is a matter of individual judgment, but nearly all professionals and the best amateurs prefer one that weighs from 19 to 22 ounces, with the tip of the cue about a half inch full in diameter. The cue-tip is one of the leading, if not the leading, factor in billiard playing. Many public and private games are lost because of the imperfect quality of the cue-tip, and many players are wont to ascribe their defeat or bad play to the tip itself. Much depends on the manner of tipping the cue. Cue-tips are made in France and are of comparatively recent origin. They consist of two qualities of leather united, the under leather being very hard and flat, while

BILLINGS — BILLINGTON

the upper or top leather is somewhat porous, spongy, and springy. Selecting a good leather and the tipping of billiard cues is an art in itself, and has become so important an adjunct to the success of the business that the leading billiard halls in this country find it necessary to employ a man to exclusively attend to that branch of the trade. It is an art, for instance, to hammer a tip down to the requisite firmness before it is ready to be glued to the top of the cue, over which the tip generally projects (if a new one), on all sides. Inside of an hour's time in dry weather, if the quality of the glue is good, the tip may be finished off ready for use. Turn the cue bottom side up, firmly press the leather onto a table, then using a sharp knife, cut the leather even with the top of the cue itself, and pare the upper leather as one would an apple, finish with sandpaper, size about 1½, and smooth off with single O sandpaper. A cue-tip, when ready for playing, should be about half-moon shape, but many and various are the shapes of tips. Never use sandpaper on a cue-tip after it has been played with for a while. If the tip becomes hard or greasy from frequent use of chalk, roll it lightly with a French file.

Billiards is without doubt far superior in point of skill and science to any game played, either in-doors or out-doors. Chess and checkers are purely mental and yield no exercise to the body. Golf and other out-of-door games are dependent chiefly on execution, whereas billiard playing requires and combines both knowledge and execution. As a health-giving exercise and recreation, restful to the mind, physicians are now agreed that billiards leads all other games, while divines, politicians, artists, men of letters, and women, recommend it and play it at home, in the clubs and public rooms. It is steadily gaining in popularity among merchants, bankers, and brokers, as a relief to the turmoil of a busy life. No residence is thought complete without its billiard table, and the question is often asked "Which shall we have first, the piano or the billiard table?" and the answer is — "the billiard table first." GEO. F. SLOSSON,

American Billiard Expert.

Billings, Frank, American physician. He graduated M.D. at Chicago Medical College, 1881; was interne at Cook County Hospital, 1881-2; studied in Vienna, 1885-6; professor of medicine at Northwestern University Medical School, 1891-8; professor of medicine and dean of Rush Medical College, 1898.

Billings, John Shaw, American surgeon and librarian. b. Switzerland County, Ind., 12 April 1839. He was graduated at Miami University in 1857, and at the Ohio Medical College, 1860; was demonstrator of anatomy in the last institution, 1860-1; entered the Union army as an assistant surgeon, 1861; was promoted to lieutenant-colonel and deputy surgeon-general, 6 June 1894; and was retired, 1 Oct. 1895. He was professor of hygiene in the University of Pennsylvania, 1893-6; and in the last year was appointed director of the New York Public Library (Astor, Lenox, and Tilden Foundations). After the close of the war Dr. Billings took charge of the library in the surgeon-general's office; reorganized the United States Marine Hospital Service; was vice-president of the National Board of Health, 1879-82; and had

charge of the compilation of vital and social statistics in the Eleventh Census. He is a member of a large number of American and foreign scientific societies, and his numerous publications include: 'Principles of Ventilation and Heating'; 'Index Catalogue of the Library of the Surgeon-General's Office, United States Army'; 'National Medical Dictionary.'

Billings, Josh. See SHAW, HENRY W.

Billings, William, American composer: b. Boston, 7 Oct. 1746; d. there, 26 Sept. 1800. He was by trade a tanner, and his opportunities of instruction in any branch of knowledge, and particularly in the theory and practice of music, were few. A love of music and considerable vocal skill, however, led him, while still young, to become a teacher of singing and a composer of psalm-tunes, which eventually found their way into every church choir of New England and became great favorites with the people. He published no less than six collections of tunes, which, with a few exceptions, were of his own composition. They were founded upon the new style of church music, then first introduced by Tansur, A. Williams, J. Arnold, and other English composers, and their contrast to the dismal old tunes previously in use naturally gave them immense popularity, and in fact caused a revolution in musical taste in New England. They were far from being perfect in the requisites of good melody and harmony, and their author, in a quaintly worded preface to his second work, entitled 'The Singing Master's Assistant' and commonly known as 'Billing's Best,' apologizes for the errors which his first collection contains; but the melodies were generally good, and, had the composer enjoyed the advantages for musical instruction which the present age affords, his compositions would doubtless have possessed a permanent value. Billings was a firm patriot, and an intimate friend of Samuel Adams, who frequently sat with him at church in the singing-choir. Many of his tunes, composed during the war of independence, breathe the true spirit of patriotism, and were sung and played wherever New England troops were stationed. Billings may fairly claim the title of the first American composer, for before his time there is no record of any musical composition by a native of this country. He is also known as "the father of New England psalmody."

Billingsgate, a word said to have been derived from Belinus Magnus, a somewhat mythic British prince, father of King Lud, about 400 B.C. More probably it came from some unknown person called Billing. It is applied to the celebrated London fish market existent at least as early as 979 A.D., made a free market in 1699, extended in 1840, rebuilt in 1852, and finally exposed to the rivalry of another market built 1874-6. The word is also used to indicate foul, abusive language, such as is popularly supposed to be employed by fish-wives who are unable to come to an amicable understanding as to the proper price of the fish about which they are negotiating. Billingsgate is used as a synonym of coarse, vulgar abuse.

Billington, Elizabeth, English singer. b. London, 1768; d. Venice, 1818. Her father was a German oboe-player, her mother an English singer. She made her appearance as a singer at the age of 14, and at 16 married Mr. Billington, a double-bass player. She made her debut as

BILLION — BIMETALLISM

an operatic singer in Dublin, and afterward appeared at Covent Garden, where she secured an engagement for the remainder of the season of 1786 for \$5,000, the manager giving her two benefits. She visited France and Italy, and Bianchi composed the opera of 'Inez de Castro' expressly for her performance at Naples.

Billion, in Great Britain and Germany, the term used to denote a million millions. In France, America, and elsewhere it denotes a thousand millions. A similar difference is found in the use of the terms trillion, quadrillion, etc.

Billiton, East Indies, an island belonging to Holland, lying between Banca and the southwest of Borneo, of an irregular sub-quadrangular form, about 40 miles across; area, 1,863 square miles. Pop. (1897) 41,558.

Billon, an alloy of copper and silver, in which the former predominates, formerly used in Austria and Germany for coins of low value, the object being to avoid the bulkiness of pure copper coin.

Billroth, Theodor, German surgeon: b. Bergen, on the island of Rugen, 26 April 1829; d. 6 Feb. 1894. He was educated at Griefswald, Göttingen, and Berlin; was professor of surgery at the University of Zurich in 1860, and at Vienna in 1867; in the war of 1870-1, he worked in German hospitals on the Rhine. He was one of the foremost surgeons of the day, not only as an operator, but as an authority on microscopic work, pathology, and military surgery.

Billy-boy, a flat-bottomed, bluff-bowed vessel generally rigged as a sloop, with a mast that can be lowered so as to admit of passing under bridges. These vessels generally belong to the Humber ports.

Bilney, Thomas, English martyr: b. probably at Norwich, about 1495; d. Norwich, 19 Aug. 1531. He studied at Trinity Hall, Cambridge, and was ordained in 1519. He was opposed to the formal "good works" of the Schoolmen, and denounced saint- and relic-worship; and to these mild Protestant views he converted Hugh Latimer and other young Cambridge men. In 1527 he was arraigned before Wolsey, and on recanting absolved, but was confined in the Tower for over a year. Stung by remorse, after two years of suffering, he began to preach in the fields of Norfolk, but was soon apprehended and condemned; and although allowed to receive the sacraments of the Church from which he differed so little, he was burned as a heretic.

Biloxi, bil-oks'i, Miss., a city in Harrison County, on Biloxi Bay, opening into the Gulf of Mexico, and the Louisville & N. R. R.; 80 miles northeast of New Orleans. It is principally engaged in the canning of oysters, fish, fruit, and vegetables, and has also considerable manufacturing and shipping interests. Biloxi is the site of the first settlement made upon the Mississippi by white men, under the direction of Pierre Le Moyne d'Iberville, in 1699. Pop. (1900) 5,467.

Biloxi Indians, one of the 10 groups of tribes into which the Siouan stock of North American Indians is divided. In 1669 they had one village on Biloxi Bay near the Gulf of Mexico. Thirty years later there were three villages, Biloxi, Paskagula, and Mactobi. A few survi-

vors of the tribe are still to be found near Lecompte, Rapides Parish, La.

Bilson, Thomas, English divine: b. Winchester, 1547; d. 1616. He was educated at Winchester School, and after completing his studies at New College, Oxford, became successively head master of the school and canon of the cathedral of Winchester. In 1585 he published a work, entitled 'The True Difference Between Christian Submission and Anti-Christian Rebellion,' intended mainly to defend the government and policy of Elizabeth; and in 1593 another work, entitled 'The Perpetual Government of Christ's Church,' still considered one of the ablest defenses of episcopacy. In 1596 he was made bishop of Worcester, and was transferred in the following year to Winchester. In 1603 Bilson preached the coronation sermon before James I., and in 1604 he took a prominent part in the celebrated conference at Hampton Court. The translation of the Bible, executed during the reign of James, was partly submitted to his revision. He was buried in the south side of Westminster Abbey.

Bilsted. See LIQUIDAMBAR.

Bilston, England, a town in Staffordshire, three miles southeast from Wolverhampton. Pop. (1901) 24,034.

Bimetallism. Gold and silver have been used as money for thousands of years, both the Old Testament and profane history making frequent reference to such use of the precious metals. See NUMISMATICS.

As time went on the metals were coined into convenient pieces, and the weight and fineness of the coins guaranteed by the government. Finally, a legal ratio between the metals was fixed and the coins made a tender in payment of debts.

The term bimetalism is employed to describe a financial system wherein gold and silver are used as standard money and coined without limit at a fixed ratio. Bimetallism proper implies, first, that the money unit shall rest upon two metals; second, that these metals shall enjoy equal and unlimited coinage privileges; third, that they shall be connected by a fixed and definite legal ratio; and fourth, that the coins made from them shall be a full legal tender.

The term "limping bimetalism" has been applied to systems wherein gold and silver were used as standard money, but in which one of the metals was not coined at all, or not coined on equal terms with the other. The term, free coinage, has sometimes been used to mean unlimited coinage and sometimes to mean gratuitous coinage. Unlimited coinage is necessary to a complete bimetallic system. When coinage is limited the volume of standard money is regulated by law; when coinage is unlimited the volume depends, first, upon the total accumulation of coin, and, second, upon the annual production of the money metals. This sum is further augmented by the coinage of gold and silver plate when money becomes scarce, or lessened by an increased demand for gold and silver in the arts when money becomes plentiful.

Gratuitous coinage is not necessary to bimetalism, although it usually accompanies it. A charge can be made for mintage without destroying the bimetallic character of the system, but such a charge necessarily creates a differ-

BIMETALLISM

ence between the coinage and the bullion value of the metal. When coinage is gratuitous melted coin can be recoined without loss; when there is a mint charge melted coin loses an amount equal to the cost of coinage. The "melting pot test" is, therefore, not a test of honest money.

Bimetallism does not rest upon any particular ratio, the coinage ratio is fixed by law, and can be changed by law. The ratio simply states the proportion existing between the silver dollar and the gold dollar when measured by weight—that is, at the ratio of 16 to 1, the silver dollar weighs 16 times as much as the gold dollar. While the legal and commercial ratios between the metals have fluctuated from time to time the legal ratio has, as a rule, caused the change in the commercial ratio, and from the beginning of history down to 1873 the fluctuations in the commercial ratio were never as sudden or as great as they have been since 1873. During the 400 years which elapsed between 1473 and 1873 the extreme variation in the commercial ratio was from 14 to 1 to 16 to 1, although during that period there were greater changes in the relative production of the metals than have occurred since. For instance, between 1800 and 1840 the world's production of silver was about 4 to 1 in value, compared with the production of gold; after the new discoveries of gold in 1849 the production of that metal so increased that the annual output of gold was soon more than 3 to 1 in value, compared with the output of silver, and yet during this tremendous change in relative production the commercial ratio was comparatively stable, owing to the fact that all the gold and all the silver could go through the mints into the world's currency. Hostile legislation has driven the metals widely apart since 1873 and it is the contention of bimetallists that friendly legislation will bring the metals together.

The ratio of 16 to 1 is the one advocated by American bimetallists, first, because it was the ratio existing when the crusade against silver began; second, because it is the ratio now existing between the silver and gold coins in circulation in the United States; and, third, because an increase in the ratio, made by increasing the size of the silver dollar, would to the extent that it was joined in by other nations require the recoinage of silver coins into larger coins, and thus reduce the world's volume of standard money. If, for instance, the ratio were changed to 32 to 1 by international agreement, and the silver money of the world, approximating \$4,000,000,000,000, were recoinage into \$2,000,000,000, it would cause a shrinkage of about 25 per cent in the total volume of metallic money and, as contracts would still call for the same number of dollars, such a change in the ratio would transfer billions of dollars in value from the wealth producers to the holders of fixed investments.

It will be noticed that bimetallism relates to the legal status of the metals rather than to their commercial value, and does not necessarily imply the simultaneous or concurrent circulation of both metals, although American bimetallists contend that the restoration of free coinage at the ratio of 16 to 1 would result in the concurrent circulation of both metals in this country. When the ratio was 15 to 1 in this country gold went to a premium of about 3 per cent because the French ratio was 15½ to 1;

when our ratio was changed to 16 to 1, silver, being undervalued at our mint as compared with its value at the French mint, rose to a premium of about 3 per cent.

The Gresham law has often been quoted against bimetallism. That law is merely a statement, made by a master of the English mint of that name, who announced as his observation that the bad coins ran the good coins out of the country—the explanation being that while, to a majority of the people, one coin was as good as another so long as it would pass current, the jewelers would melt and the dealers in money would collect and export the heaviest coins (coins passing by weight rather than by legal tender outside of their own country). It can readily be seen that the Gresham law was not intended to apply to the use of two metals, and that it can apply to the use of two metals only when there is difference between government ratios. When, for instance, we had a ratio of 15 to 1 in this country, and the French ratio was 15½ to 1, there was a tendency to send American gold to France and bring French silver to the United States, and yet this tendency did not cause the exportation of all American gold to France or of all French silver to the United States. France, being at that time the stronger nation commercially, fixed the ratio and our gold rose to a premium. In the payment of debts silver was the money employed, and gold, when it was used, was used at its commodity price. After 1834 the situation was reversed and silver went to a premium. Gold was then used for the payment of debts and for general transactions, and silver, when it was used, brought a premium. It is not fair to say, however, that gold went out of circulation entirely during the former period or that silver went out of circulation entirely during the latter period, for a great deal of the undervalued coin remained here and served the purpose of money, and to that extent relieved the pressure upon other kinds of money. That which left our country in exchange for another kind of metal did not reduce our circulation, and the exported coin still remained a part of the circulation of the world and helped to fix international prices.

In bimetallism the debtor always has the option. This is true, not because of a desire on the part of the government to favor the debtor, but because the parity can be maintained in no other way. If the debtor has the option the desire of all debtors to secure that metal which is the cheaper, will in itself, by increasing the demand for the cheaper metal and decreasing the demand for the dearer metal, tend to make the commercial value of the metals identical with the legal value, whereas, through the operation of the same selfishness, the metals would be driven apart if the creditor had the option, because the demand of the creditors for the dearer metal would still further increase its price, while the lessened demand for the cheaper metal would still further decrease its price.

The arguments in defense of the bimetallic system begin with the self-evident truth that stability in purchasing power is the test of virtue or honesty in money—that dollar being the best dollar which changes least from year to year in its command over all articles of merchandise. Stability would not be so important if all transactions were on a cash basis, but with

BIMETALLISM

the increase in credits, especially long time credits, it is a matter of vital importance to have the purchasing power of the dollar fluctuate as little as possible. Jacobs, in his work on the precious metals, shows that an increase of 2 per cent a year in the purchasing power of the dollar would amount to an increase of 500 per cent in 100 years. It will be seen, therefore, that the burden of national debts and other long-time securities may be materially increased or decreased by a change in the purchasing power of the dollar.

That the value or purchasing power of the dollar depends upon the number of dollars has been declared to be, and correctly so, the most fundamental principal in the science of money. To illustrate: if the business of the world is adjusted to a certain volume of money, and that volume of money is afterward suddenly doubled, prices will necessarily rise, because there will be more money with which to purchase other things. If, on the other hand, the volume of money is suddenly reduced one half prices will fall because of the scarcity of money. Next to absolute stability in the purchasing power of the dollar or unit, the most desirable thing is that any necessary change in the purchasing power of the dollar shall be gradual rather than sudden, and a sudden change in the value of the dollar can only be prevented by the prevention of a sudden change in the volume of money. When it is remembered that the money changer and the owner of fixed investments profit by a rising dollar it is easy to understand why they have always led the movements in favor of scarce money.

Dr Sturtevant in his book, entitled 'Economics, or the Science of Wealth,' illustrates the gradual change in the volume of metallic money as follows:

"Gold and silver, considered as a standard value, are an ocean flowing around the whole economic world, and very large additions at two or three points are immediately distributed to every part."

The quantity of metallic money is so great that the annual addition to it is small in comparison.

Bimetallism is theoretically better than monometallism (either of gold or silver), because under the double or bimetallic standard the volume of money changes less rapidly and less suddenly than under the single standard. Thus far history has shown no instance of a large simultaneous increase in the production of both gold and silver. There was an enormous increase in the production of silver during the 16th century; then there was a great increase in the production of gold during the year 1849 and the years immediately following. Early in the 'seventies there was another increase in the production of silver and we are just now enjoying a considerable increase in the production of gold. In each instance the increase in the production of one metal has spread itself over the entire volume of money and has, therefore, caused a less proportionate increase than it would have caused had the world been using but one metal, either gold or silver, as standard money.

The superior stability of the bimetallic system over the monometallic system has been shown by many illustrations, the most familiar being that which likens the volume of money to

a body or water receiving the inflow from two rivers instead of one.

The practical argument in favor of bimetallism is that neither metal alone furnishes a sufficient quantity of money to support the world's commerce. Bimetallism is, therefore, actually necessary as well as theoretically advantageous. This phase of the question was not much considered until after 1873 because, prior to that date, there were sufficient mints open to the coinage of both metals to furnish a monetary use for every ounce produced. When all of the gold and silver available for coinage could go through the mints into the currency, each nation could consider the question from a purely theoretical standpoint, because so long as the commercial world had the benefit of the entire volume of gold and silver, it did not make so much difference how many nations used one metal, or the other, or both. When, however, the crusade against silver began and enough nations joined in it to reduce the demand for silver below the supply available for coinage, then each nation was compelled to consider not only its preference as to a standard, but whether—and it was a vital question—it was always sure of having a sufficient quantity of the chosen metal.

The advocates of bimetallism not only contend that the law of supply and demand regulates the value of the dollar—an increase in the demand, the supply remaining the same, raising the purchasing power of the dollar, and an increase in the supply, the demand remaining the same, decreasing the purchasing power of the dollar, but they also believe that supply and demand regulate the market price of the metals.

The contention of monometallists that it is impossible to fix a relation between two metals is met with the reply that the relation between two things of limited production, such as gold and silver, can be fixed by any nation or group of nations which can furnish a use for so much of both metals as is available for coinage. Gold and silver differ from agricultural products in that they must be found before they can be produced. If gold and silver could be raised from seed and cultivated practically without limit, as, for instance, corn and wheat can be, it would be very difficult if not impossible to fix a relation between them, but they are called precious metals because they are scarce.

The demand created by the government must be considered as added to the demand created by the arts. If the demand created by the government is sufficient to utilize the surplus over and above what the arts require, the commercial value can be kept up to the coinage value for the reason that each owner will seek the highest possible price, and so long as the government stands ready to convert a given amount of metal into a given amount of money, he will not have to dispose of the metal to any one else for less than the government price. If the government, instead of standing ready to convert one metal into money, stands ready to convert two metals into money, it can make the commercial ratio and the coinage ratio identical, if there is a use for the money. The changes in relative production would not affect this condition so long as the government was able to utilize all of the surplus of both metals.

The influence exerted by the legal ratio on the commercial ratio is well described by the

BIMETALLISM

Royal Commission of England, which in its report of 1888 said: "Nor does it appear to us *a priori* unreasonable to suppose that the existence in the Latin Union of a bimetallic system with a ratio of $15\frac{1}{2}$ to 1 fixed between the two metals, should have been capable of keeping the market price of silver steady at approximately that rate. The view that it could only affect the market price to the extent to which there was a demand for it for currency purposes in the Latin Union, or to which it was actually taken to the mints of those countries is, we think, fallacious. The fact that the owner of silver could, in the last resort, take it to those mints and have it converted into coin which would purchase commodities, at the ratio of $15\frac{1}{2}$ of silver to 1 of gold, would, in our opinion, be likely to affect the price of silver in the market generally, whoever the purchaser and for whatever country it was destined. It would enable the holder of the silver to stand out for a price approximating to the legal ratio and would tend to keep the market steady at about that point."

Independent bimetallists and international bimetallists agree as to the theoretical and practical benefits of the double standard, but differ as to the ability of the United States to maintain the parity alone, the former believing, and the latter denying, that under conditions as they now exist our nation is able to utilize all the silver that could come to our mint.

If our government offered to coin into money at a fixed ratio every ounce of gold and silver presented at the mint, the supply brought to the mint would necessarily come from one of three sources—that is, from silver bullion already in existence, from silver coin of other countries, or from the annual product of the mines.

As there is no considerable quantity of silver held in the form of bullion, there could be no material increase in our coinage from that source.

Whether silver coin would come to our mint from other countries would depend entirely upon the ratio. The fear that, under bimetalism, our country would be flooded with the coined silver of the world, is entirely without foundation, for the reason that our ratio, 16 to 1, is more favorable to gold than the ratio existing between gold and silver in the nations that have a large quantity of silver coin. France, for instance, is the largest European holder of silver, but as her silver now circulates on a parity with gold at a ratio of $15\frac{1}{2}$ to 1, it could only come here at a loss equivalent to about three cents on the dollar.

Whether the mines would furnish an excessive amount of silver is a question about which no one could speak positively, because no one can foresee new discoveries or estimate the possible exhaustion of mines now being worked. There is, however, nothing in the past to justify a fear of over-production.

Raising the government price of a precious metal does not necessarily increase the production of it, neither does the lowering of the price necessarily reduce the production. For instance, the law of 1834 reduced the government price of gold, and yet soon afterward there was a wonderful increase in the production of gold. The discoveries of silver following 1870 were not brought about by an in-

crease in the price of silver, and for several years the production of silver increased, even with a falling market. The monetary use of gold and silver is the controlling use. If, by agreement among all the nations, the legal tender function was withdrawn from both gold and silver, and other money substituted for them, both would fall in value, just how much no one knows, because a fall in the price of either of the metals would develop new uses and thus increase the demand, which, in its turn, would act with the supply in determining the ultimate price. While it is probable that a higher price for silver bullion would cause the re-opening of some mines which have been abandoned because of the low price of silver, the production of silver would not be likely to be increased to any such extent as has been imagined.

It is not out of place to refer, in this connection, to another matter which has been the subject of much speculation, namely, the cost of producing gold and silver. The labor cost has less influence on the price of gold and silver than upon products of the soil. In the case of agricultural products, an attempt to raise the price of any kind of crop much above the cost of production would immediately be followed by such an increase in the crop as to at once cause a supply that would reduce the price. If, on the other hand, the cost of producing a particular kind of crop is increased out of proportion to the price, the production will fall off until the scarcity of the article raises the price. In the case of the precious metals, however, the supply cannot be increased at will, and therefore the price does not necessarily vary with the cost of production. If, for illustration, all the gold mines were to be exhausted excepting one, and this one mine began producing just the amount that all the mines now produce, but no more, the price of gold would remain the same whether it was produced at \$100 an ounce or at 1 cent an ounce.

We have no means of ascertaining the labor cost of either gold or silver. About 10 years ago the director of the mint was asked for statistics in regard to the labor cost of producing gold and silver, and his reply was that there were no statistics in regard to gold and none of any value in regard to silver, because the statistics were gathered from the mines in operation and did not include the money expended in prospecting and in mines that had ceased to produce. No two mines in the world have produced either gold or silver at the same cost for any considerable period. If we take into account the money spent in prospecting and the money spent in the purchase of claims that have proven worthless, as well as the money invested in machinery and other appliances, it is probable that more than \$100 has been expended for every dollar of either gold or silver taken out of the earth, and it is also probable that, dollar for dollar, it has cost less to produce gold than silver; first, because gold is often found in nuggets, while silver is found in veins, and second, because gold is often found on the surface, while silver is, as a rule, a deep-mine product.

Space does not permit a history of the conflict between the standards in Europe. England has maintained the gold standard for about a century and has exerted a controlling influence

BIMETALLISM

on several other European nations. During this period France, although free coinage is now suspended, has been the most loyal supporter of bimetalism and as late as 1897 offered to join the United States in the restoration of coinage, provided England and Germany would do likewise.

After the gold discoveries of 1849, the European financiers became alarmed lest the increased production of the yellow metal would largely aid debtors, and there was quite a sentiment in favor of the demonitization of gold. Writers like Chevalier were complaining that holders of fixed investments were in danger of suffering from a cheap gold dollar. It was exactly the same argument that was made against the white metal a little later when the Comstock lode and other rich deposits of silver were discovered.

Bimetalism in the United States—The bimetallic standard was recommended by Jefferson and Hamilton, and adopted by our government by a statute approved by George Washington 2 April 1792. This law provided for the free and unlimited coinage of silver and gold at the ratio of 15 to 1, the coins being equally a legal tender for all debts public and private. The Spanish milled dollar then in use in this country contained the same amount of pure silver as our present silver dollar and, the ratio of 15 to 1 having been adopted, the gold dollar was made to weigh one fifteenth as much. The silver dollars then coined (many of which are now in existence), are sometimes called the "unit dollars," because they have on the edge the following inscription: "Hundred Cents, One Dollar, or Unit."

In 1834 (28 June) the ratio was changed from 15 to 1 to 15.988 + to 1, which for convenience has been called 16 to 1. The change was made for the purpose of checking the exportation of gold, but as the new ratio undervalued silver it made gold the money in general use. This law, supported by Thomas H. Benton, and approved by Andrew Jackson, provided for the free and unlimited coinage of gold and silver into full legal tender money at the new ratio. In 1837 (28 January) the alloy in the dollar, both gold and silver, was changed from one twelfth to one tenth, making the weight of the standard silver dollar $412\frac{1}{2}$ grains, nine tenths fine, and the weight of the standard gold dollar 25.8-10 grains, nine tenths fine.

As the law of 1834 undervalued silver and led to the exportation of considerable quantities of it, it became difficult to keep fractional currency in circulation, and to remedy this the law of 1853 was enacted. By the terms of this law subsidiary silver (that is, coins of less denomination than \$1.00), were reduced from full weight to light weight and made token money, with limited legal tender, instead of standard money. This law, however, did not change the provision in regard to the standard silver dollar, the free and unlimited coinage of that dollar still continuing. The subsidiary silver coins were redeemable in the standard money, either gold or silver. Sometimes the Act of 1834 has been referred to as establishing the gold standard, but this is erroneous. It merely changed the ratio and that, too, by reducing the weight of the dearer dollar, not by increasing the cheaper dollar. Equally erroneous is the assertion that the Act of 1853 established the

gold standard. That did not in the least change the law relating to the standard money, either gold or silver.

On 12 July 1873 the demonetization of silver was effected by an act entitled "An Act Revising and Amending the Laws Relative to the Mints, Assay Offices, and Coinage of the United States" (A similar law having the same purpose had just before been enacted in England, and a copy of it delivered to the director of our mint.)

When this law was passed the business of the country was being transacted with paper money, both gold and silver being at a premium—silver at a greater premium than gold. No attention was being paid to the subject of metallic money and the purpose of the law of 1873 was not generally understood. In making provision for silver coinage it omitted the coinage of the standard silver dollar, and substituted for it a trade dollar of 420 grains which was intended for use in the Orient, it being thought that the trade dollar would compete with the Mexican dollar in China and other Eastern countries. In 1874 (20 January) the Federal statutes were revised, and in this revision a clause was inserted limiting the legal tender of silver coins to \$5.00. Neither the Act of 1873 nor the Act of 1874 was generally discussed, and it is only the recognition of a well-settled fact of history to say that this discrimination against silver and in favor of gold was not known among the people and not thoroughly discussed even in Congress. When the matter became known an active agitation for the restoration of silver at once began, and nearly all of those who voted for the measure denied that they knew that the Act of 1873 was intended to demonetize silver.

The suspension of silver coinage by the United States alone would not have caused a fall in the price of silver as measured with gold, but other nations joining in the demonetization of silver it soon became apparent that the mints still open could not utilize all the silver available for coinage, and the gold price of silver began to decline. The effort to reopen the mints to silver resulted in the passage of what was known as the Bland-Allison Act. The bill, as it passed the House, under the leadership of Richard P. Bland, of Missouri, restored the free and unlimited coinage of gold and silver at the ratio of 16 to 1. The opposition in the Senate was sufficient, however, to defeat the bill in its original form, and to compel the acceptance of a substitute framed by Senator Allison, whose name was thus connected with the law. This compromise measure provided that there should be "coined at the several mints of the United States silver dollars of the weight of $412\frac{1}{2}$ grains troy of standard silver as provided by the Act of January 1837," and also provided that such silver dollars "together with all silver dollars heretofore coined by the United States of like weight and fineness" should be "a legal tender at their nominal value for all debts and dues public and private, except where otherwise expressly stipulated in the contract."

It will be seen that this law restored the coinage of silver dollars under the law of 1837, but did not contain the former provision in regard to the unlimited coinage of silver on private account as gold was then and is now coined. In order to secure the bullion out of

BIMETALLISM

which to coin the dollars mentioned in the Act of 1878, the law provided "that the secretary of the treasury is authorized and directed to purchase, from time to time, silver bullion, at the market price thereof, not less than \$2,000,000 worth per month, nor more than \$4,000,000 worth, and cause the same to be coined monthly, as fast as so purchased, into such dollars."

In carrying out the provisions of the law, the Treasury Department purchased the minimum required rather than the maximum permitted.

It will be seen, also, that while the silver dollar was restored to general legal tender, a provision was inserted that permitted the exclusion of the dollar by private contract—that is, private individuals were permitted to discriminate against silver, although they were not permitted to discriminate against gold. The purchase of silver for coinage under this act required the fall in the price of silver, but as it did not consume the entire surplus it was not sufficient to restore the price of bullion to the coinage price of \$1 29 an ounce.

The Bland-Allison Act remained on the statute books until 1890, when it was repealed by what was known as the Sherman Purchase Act, which provided for the purchase of 4,500,000 ounces of silver per month, or so much thereof as might be offered at a price not exceeding the coinage value, the bullion to be paid for by the issue of treasury notes, redeemable in coin, and after the first of July 1891 only so much of the silver was to be coined as was necessary to redeem the treasury notes presented.

This act immediately increased the demand for silver and raised the price of silver bullion, not only in the United States, but all over the world, to about \$1 21 an ounce. But when it was found that even this demand was not sufficient to utilize all the surplus silver, the price again began to fall.

Secretary Rusk, in the Agricultural Report of 1890, called attention to the fact that the Sherman Purchase Law raised the price of silver and declared that that rise in price "unquestionably had much to do with the recent advance in the price of cereals," and added, "the same cause has advanced the price of wheat in Russia and India, and in the same degree reduced their power of competition. English gold was formerly exchanged for cheap silver, and wheat purchased with the cheap silver metal was sold in Great Britain for gold. Much of this advantage is lost by the appreciation of silver in those countries."

The Sherman Act was also a compromise, urged by the opponents of silver to prevent the passage of a free coinage law. Mr. Sherman, in his 'Recollections,' published in 1895, thus speaks of the strength of the free silver movement, and of the purpose of the compromise.

"A large majority of the Senate favored free silver, and it was feared that the small majority against it in the other House might yield and agree to it. The silence of the President on the matter gave rise to an apprehension that if a free coinage bill should pass both Houses he would not feel at liberty to veto it. Some action had to be taken to prevent a return to free silver coinage, and the measure evolved was the best obtainable. I voted for it, but the day it became a law I was ready to

repeal it, if repeal could be had without substituting in its place absolute free coinage."

The treasury notes issued in the purchase of silver were made a legal tender for the payment of all debts public and private, except where excluded by contract, and were redeemable by the secretary of the treasury "in gold or silver coin at his discretion." It will be seen that the option as to the coin of payment was reserved to the government, but another clause in the measure which declared it to be "the established policy of the United States to maintain the two metals on a parity with each other upon the present legal ratio or such ratio as may be provided by the law," was afterward construed by the Treasury Department to deprive the secretary of the option. At any rate the department adopted the policy of paying in gold when gold was demanded, and although Secretary Carlisle afterward declared before one of the House committees that it would have been better for the government to have reserved the option, he, when he came into office, followed the precedent set by his predecessor.

This ruling of the Treasury Department was followed by the presentation of treasury notes and a demand for gold, and the drain upon gold which followed was used as an argument in favor of the repeal of the purchase clause of the law. The treasury note was declared to be an endless chain, although it only became an endless chain when the department surrendered the option which the law expressly conferred upon it. It may be added that the same endless chain argument has been made against the greenback, and can be made against the silver dollar if it is ever made specifically redeemable in gold.

What has sometimes been called "the silver movement" began with the discovery of the effect of the law of 1873, and has continued with varying force ever since. It was called the silver movement, not because of partiality to silver, but because silver was the metal discriminated against. It might better be designated as the bimetallic movement, because it was an effort to restore bimetalism, and the supporters of the movement asked for silver nothing more than was already granted to gold. The movement did not originate in the mining States, but extended over the entire country and throughout other countries, the interest being centred in silver as a money rather than in silver as a metal.

During the period that has elapsed since 1873 three international conferences have been held with a view to the restoration of silver (at Paris in 1878 and in 1881, and at Brussels in 1892), but they have been unsuccessful, largely because other European countries have hesitated to act without England, and England, being largely a creditor nation, has been unwilling to surrender the advantage which a rising dollar has given her in the increased purchasing power of her credits.

In the summer of 1893, the President, giving as his reason the suspension of the coinage of silver in India, called Congress together in extraordinary session and recommended the unconditional repeal of the purchase clause of the Sherman Law. Congressman Wilson, chairman of the Committee of Ways and Means, and leader of the administration forces in the House, introduced a bill identical in purpose and almost

BIMETALLISM

identical in language with one introduced by Senator Sherman a year before. The object of this bill was to repeal the purchase clause of the Sherman Law without substituting any provision for the further coinage of silver. It was supported by all who were opposed to bimetalism, and by some who declared themselves in favor of bimetalism but criticised the purchase of silver on the ground that it was contrary to the theory of bimetalism. These insisted that as soon as the Sherman Law was repealed the remainder of the Democratic platform would be carried out and bimetallic coinage re-established. A few were induced to support the measure under the belief that the suspension of silver coinage here would force European nations to an agreement for the restoration of bimetalism throughout the world. After a prolonged contest this bill became a law 1 Nov 1893. Following this an attempt was made to secure the coinage of the seigniorage which had accumulated in the treasury. This bill passed both Houses, receiving the support of many who voted for the repeal of the purchase clause of the Sherman Law, but the measure was vetoed by the President. The administration then attempted to secure the passage of a law authorizing the issue of gold bonds, but this was defeated in the House of Representatives.

As the Act of 1893 virtually opened the campaign of 1896, in which the silver question figured so prominently, it may be well to consider the platforms adopted just before and just after that date.

During the period extending from 1873 to 1896 the platforms of the two leading parties, while more or less ambiguous on the money question, recognized the advantages of the double standard. In 1884 the Republican platform declared in favor of an international conference to fix the relative value of gold and silver coin, while the Democratic platform declared in favor of "honest money, the gold and silver coinage of the Constitution, and a circulation medium convertible into such money without loss." In 1888 the Democratic party reaffirmed the platform of 1884, while the Republican party inserted the following plank in its platform: "The Republican party is in favor of the use of both gold and silver as money, and condemns the policy of the Democratic administration in its efforts to demonetize silver."

In 1892 the Republican platform said: "The American people from tradition and interest favor bimetalism, and the Republican party demands the use of both gold and silver as standard money," and then followed a clause demanding "that the purchasing and debt-paying power of the dollar, whether of silver, gold, or paper, shall be equal at all times."

The Democratic party that year denounced the Sherman Law (the Act of 1890) as a cowardly makeshift, and demanded its speedy repeal, and then declared the party's position as follows:

"We hold to the use of both gold and silver as the standard money of the country, and to the coinage of both gold and silver without discrimination against either metal or charge for mintage, but the dollar unit of coinage of both metals must be of equal intrinsic and exchange-

able value or be adjusted through international agreement, or by such safeguards of legislation as shall insure the maintenance of the parity of the two metals, and the equal power of every dollar at all times in the markets, and in the payments of debts; and we demand that all paper currency shall be kept at par with, and redeemable in, such coin. We insist upon this policy as especially necessary for the protection of the farmers and laboring classes, the first and most defenseless victims of unstable money and a fluctuating currency."

The Populist party, which polled about 1,000,000 votes that year, demanded "the free and unlimited coinage of silver and gold at the present legal ratio of 16 to 1." This was the first national platform which specifically named the ratio, but a majority of the Democrats in Congress and many Republicans had for years been voting for bills providing for free and unlimited coinage at this ratio.

In the campaign of 1896, the money question was the paramount issue. The Democratic platform, adopted at Chicago, demanded "the free and unlimited coinage of both silver and gold at the legal ratio of 16 to 1, without waiting for the aid or consent of any other nation." The People's party, which met two weeks later, adopted a plank substantially like it, as did also the Silver Republican party.

The Gold Democrats, who withdrew from the Chicago convention, met at Indianapolis and declared in favor of the gold standard.

The Republican party said: "We are unalterably opposed to every measure calculated to debase our currency or impair the credit of our country. We are therefore opposed to the free coinage of silver except by international agreement with the leading commercial nations of the world, which we pledge ourselves to promote, and until such agreement can be obtained, the existing gold standard must be preserved."

In March 1896 a resolution was adopted in the English Parliament pledging the government to assist in restoring the par of exchange between gold and silver, and this pledge encouraged many in this country to hope for an international agreement.

The campaign of 1896 resulted in the election of the Republican ticket by a large majority, but as that party had committed itself to international bimetalism, the verdict at the polls was a victory for the double standard rather than for the single gold standard.

In pursuance of the promise contained in the Republican platform, President McKinley, immediately upon taking his seat, sent a commission to Europe to solicit co-operation in the restoration of silver to its former place by the side of gold, but this commission failed to secure any concessions from England and no formal conference was arranged.

In 1900, the Democratic party, the People's party, and the Silver Republican party adhered to the positions taken on the money question in 1896, while the Republican platform said: "We renew our allegiance to the principle of the gold standard and declare our confidence in the wisdom of the legislation of the 56th Congress, by which the parity of our money and the standard of our currency on the gold basis has been secured."

BIN—BINARY THEORY

The election in 1900 resulted in an increased electoral and popular majority for the Republican ticket, but other questions over-shadowed the money question in this campaign, and the result was again undecisive as to the standards.

The large and unexpected increase in the output of gold in Alaska, the United States, South Africa, and Australia has very considerably increased the supply of money, and to some extent relieved the strain which began with the demonetization of silver in 1873, but with the white metal still furnishing nearly one half of the world's basic money there is no reason to believe from past or present indications that silver can be dispensed with as a standard money. The gold standard cannot be accepted as a finality in any country until it is accepted as a finality throughout the world, for each nation's supply of metallic money is influenced by the demand created by each other nation. It is probable, therefore, that what is called the money question, will, in so far as it relates to metallic money, increase or decrease in importance in inverse ratio to the supply of money, occupying more attention when a decrease in the volume of money reduces prices and being less considered whenever an increase in the volume of money increases prices. See DEMOCRATIC PARTY; PEOPLE'S PARTY; REPUBLICAN PARTY; SILVER REPUBLICAN PARTY.

William McKinley and G. A. Hobart were the Republican candidates for President and Vice-President in 1896 and William Jennings Bryan and Arthur Sewall the Democratic candidates. The People's party nominated Mr. Bryan, but substituted Thomas A. Watson for Mr. Sewall for Vice-President. The Silver Republicans endorsed both Bryan and Sewall. The Gold Democrats nominated John M. Palmer and Simon B. Buckner. In 1900 William McKinley and Theodore Roosevelt represented the Republicans, and William Jennings Bryan and Adlai E. Stevenson represented the Democrats, Populists, and Silver Republicans.

Bibliography—'Coinage Laws of the United States'; English Gold and Silver Commission, Report for 1888; International Conferences of 1878, 1881, and 1892 (Reports); Altgeld (J. P.), 'Live Questions'; Barker (Wharton), 'Bimetallism'; Byars, 'The American Commoner' (a biographical work containing Speeches of Richard P. Bland'; Cernuschi (Henry), 'Nomisma or Legal Tender'; Chevalier, 'Gold'; Copperthwaite (J. Howard), 'Money, Silver, and Finance'; Del Mar (A.), 'Barbara Villiers, or a History of Monetary Crimes'; 'History of Money,' 'History of Money in America,' 'History of Monetary Systems,' 'History of Precious Metals'; George (Lyman F.), 'Falling Prices'; Giffen (Robt.), 'The Case against Bimetallism'; Grimaudet (François), 'Law of Payment'; Harvey (W. H.), 'Coin's Financial School'; Horton (Dana S.), 'Silver in Europe'; Humboldt (A. von), 'Fluctuations of Gold'; Jacobs, 'The Precious Metals'; Jevons (W. S.), 'Money the Mechanism of Exchange'; Keeler (B. C.), 'How Silver was Secretly Demonetized'; Laughlin (J. L.), 'History of Bimetallism in the United States'; Laveleye (Emil D.), 'Elements of Political Economy'; Leavitt (Samuel), 'Our Monetary Wars'; Littleton (C. H. S.), 'Money and Prosperity'; Mill (J. S.), 'Principles of Political Economy'; Muhlman, 'Monetary Systems of the World'; Price (Bonamy), 'Currency and Banking'; Price (L. L.), 'Money and Its Relation to Prices'; Read (George), 'Valics, or the Sci-

ence of Value'; Seyd (Ernest), 'Bullion and Foreign Exchanges'; Smith (Adam), 'Wealth of Nations'; Stokes (Anson Phelps), 'Joint Metallism'; Teller (James H.), 'Battle of the Standards'; Walker (Francis A.), 'International Bimetallism'; Walsh (Archbishop), 'Bimetallism'; Watson (David K.), 'History of American Coinage.' 'The First Battle' was issued by Mr. Bryan in 1897. It contained a brief history of the silver movement, an account of the campaign of 1896 and reproduces his principal speeches on bimetallism.

WILLIAM JENNINGS BRYAN,
Editor 'The Commoner.'

Bin, Jean Baptiste Philippe Emile, zhôn báp-têst fê-lêp â-mêl, French painter b. Paris 10 Feb. 1825. He is a pupil of Gosse and Cogniet. In 1878 he was made a member of the Legion of Honor, and in 1881 was conspicuous as one of the founders of the Society of French Artists. Since that time he has taken an active part in politics and has been elected mayor of the 18th *arrondissement*. His 'Prometheus Chained' is in the Museum at Marseilles. Among his historic portraits are those of MM. Clemenceau, Rousseau, Deschamps, etc. He works principally in portraiture and decorative painting, in both of which lines he has been eminently successful.

Binalonan, Philippines, a town of the province of Pangasinan, Luzon, situated in the western part of the island of Luzon, about 20 miles from the coast, at the junction of several highroads. Pop. 10,295

Binan, Philippines, a town of the province of Laguna, Luzon, situated on the Bay Luzon, about 15 miles south of Manila, on highroads connecting it with Cavite, Manila, and other important towns. Pop. 19,786.

Binary Arithmetic, a method of notation invented by Leibnitz, but which appears to have been in use in China about 4,000 years ago. As the term binary implies, there are only two characters in this notation; these are 1 and 0. By it, our 1 is noted by 1, our 2 by 10, 3 by 11, 4 by 100, 5 by 101, 6 by 110, 7 by 111, 8 by 1000, 9 by 1001, 10 by 1010, etc. The principle is that 0 multiplies by 2 in place of by 10, as on the common system. Some properties of numbers may be more simply presented on this plan than on the common one; but the number of places of figures required to express a sum of any magnitude is a fatal objection to its use. Indeed, Leibnitz himself did not recommend it for practical adoption.

Binary Logarithms, a system of logarithms devised by Euler for facilitating musical calculations. Instead of having, like the common system of logarithms, 1 as the logarithm of 10, and 43,429,448 as the modulus, it had 1 as the logarithm of 2, and the modulus 1,442,695.

Bi'nary Star. See DOUBLE STAR.

Binary Theory, in chemistry, a hypothesis proposed by Davy to reduce the haloid salts (as NaCl) and the oxygen salts (as NaNO₃) to the same type, the monad Cl' being replaced by the monad radical containing oxygen (NO₃). Acids are hydrogen salts, as HCl, or H(NO₃). A radical is only part of a molecule, which can unite with or replace an element or another radical, atomicity for atomicity. Thus the dyad radical (SO₂) can replace two monad radicals,

(NO₃)₂, as in the equation $Pb^{II}(NO_3)_2 + Mg^{II}(SO_4) = Pb^{II}(SO_4) + Mg^{II}(NO_3)_2$. A radical cannot exist in a separate state.

Binbir-kilisseh, bēn'bēr-kē-lē-sā', some ruins of ancient tombs in the pashalic of Karamania, Asia Minor, 20 miles north-northwest of Karaman, supposed to occupy the site of Lystra, where the cripple was healed by Paul.

Bindraban, būn-dra-būn', or **Brindaban**, India, a town in the Northwestern Provinces, in the district of Mattra, and 35 miles north-northwest of Agra, on the right bank of the Jumna. It is famous as the scene of the youthful sports of Krishna, who has still many temples here. Among these is a cruciform pagoda, which is one of the most massy and elaborate of Brahmanical buildings. Pop. 31,611.

Bindweed. See CONVOLULUS.

Binet, bē-nā, Alfred, French psychologist: b. Nice, 8 July 1857. At first he studied law and medicine at Paris, but in 1880 took up the study of psychology, both experimental and pathological, and was later appointed director of the laboratory of physiological psychology at the Sorbonne, Paris. He has been one of the editors of 'L'Année psychologique'; has contributed numerous articles to scientific and philosophical periodicals, including 'Mind'; and has written 'Animal Magnetism' (translated into English); 'Studies in Experimental Psychology' (one part of which, on micro-organisms, was translated separately); and 'Introduction to Experimental Psychology' (with Philippe and others).

Binet, Victor Jean Baptiste Barthelemy, zhōn bāp-tēst bar-tāl-mē, French landscape painter: b. Rouen, 17 March 1849. He belongs to the realistic school, and made his debut in the Salon of 1878, showing 'The Warren.' One of the most famous of his pictures is 'The Plain at St. Aubin-sur-Quillebeuf,' in the Museum at Amiens. In 1889 he was awarded a first-class medal at the Paris Exposition.

Bingen, Germany, a town of the grand-duchy of Hesse-Darmstadt, on the left bank of the Rhine and the right of the Nahe. Bingen existed in the time of the Romans, by whom it was called Vincum or Bingium. The bridge over the Nahe is said to have been built by Drusus, and bears his name. In the neighborhood are the remains of a castle, where the Emperor Henry IV. was detained a prisoner in 1105, and the Mäuse-thurm or Mouse-tower, in the middle of the river, the scene of the ancient legend of Archbishop Hatto, who was devoured by rats. A dangerous passage on the Rhine, called the Bingerloch, has been opened up by the blasting of sunken rocks, leaving a channel of 210 feet wide. Bingen is the market for the sale of wines produced in the neighborhood. Pop. (1895) 8,187.

Binger, Louis Gustave, bān-zhā, loo-ē, goos-tāv, French soldier and African explorer: b. 14 Oct. 1856. He made his way from the Upper Niger to Grand Bassam in 1887-9, thus connecting the French possessions with the Ivory Coast. In 1892 he was commissioner of the French government to settle the Ashanti boundaries with England.

Bingham, Hiram, American Congregational clergyman: b. Bennington, Vt., 30 Oct. 1789; d. 11 Nov. 1869. He graduated from Andover Theological Seminary in 1819; and was one of the first missionaries of the Congregational Church to be sent to the Sandwich Islands, where he acquired much influence with the natives.

Bingham, Joel Foote, American clergyman: b. Conn. 1827. He entered the Congregational ministry, but in 1871 exchanged it for that of the Episcopal Church. He has written 'The Christian Marriage Ceremony'; 'The Twin Sisters of Martigny,' an Italian story; 'Francesca da Rimini,' from the Italian of Silvio Pellico.

Bingham, John A., American politician: b. Mercer, Pa., 1815; d. Cadiz, Ohio, 20 March 1900. He studied at Franklin College, Ohio, and became a lawyer in 1840. He was elected to Congress as a Republican in 1854, and retained his seat 1855-63. He was chairman of the managers of the House in the impeachment of Judge Humphreys, for high treason, in 1862. President Lincoln appointed him military judge-advocate in 1864, and later in the same year solicitor of the United States Court of Claims. He was special judge-advocate in the trial of the assassins of President Lincoln. He sat in Congress again 1866-73. He was one of the managers of the impeachment trial of President Johnson. From 1873 to 1885 he was United States minister to Japan.

Bingham, Joseph, English clergyman and antiquarian: b. Wakefield, Yorkshire, 1668; d. 17 Aug. 1723. He distinguished himself as a student at University College, Oxford, and devoted his attention particularly to ecclesiastical antiquities. He graduated in 1688, and became a Fellow the following year; but had to withdraw from the university on the charge of preaching unsound doctrines. He now became curate of Headbourn-Worthy, near Winchester, and there, while possessed of a scanty living on which his numerous family could barely subsist, had the merit of composing one of the most learned works of which his church can boast. This work, 'Origines Ecclesiasticæ, or The Antiquities of the Christian Church,' was published in 10 volumes octavo (1708-22), and is still a standard on the subjects of which it treats. The best modern edition is that published at the Clarendon Press (1855, 10 vols.). It was soon translated into Latin and published in Germany. In 1712 he was collated to the living of Havant, near Portsmouth, where he died.

Bingham, Kinsley S., American legislator: b. Camillus, N. Y., 16 Dec. 1801; d. Green Oak, Mich., 5 Oct. 1861. He studied law and went to Michigan in 1833. He was a judge of probate, speaker of the State House of Representatives; member of Congress 1849-51; governor of Michigan 1855-9, and U. S. senator 1859-61.

Binghamton, N. Y., a city and county-seat of Broome County, at the junction of the Chenango and Susquehanna rivers, and on several railroads; 50 miles east of Elmira. It stands more than 850 feet above tidewater, and both rivers are here spanned by several

BINGLEY — BINNEY

bridges. The city is supplied with water by the Holly system, which cost over \$1,500,000; has nearly 100 miles of streets lighted by electricity, and contains over 30 churches, and chapels, public school property valued at over \$425,000, a public library, two national banks, and an assessed property valuation exceeding \$20,000,000. Among the attractions of Binghamton, which has been named the "Parlor City," are Ross Park, Bennett Grove, and the driving parks and fair grounds. The noteworthy buildings include the State asylum for the insane, U. S. government building, State armory, new courthouse, city hall, two orphan asylums, the Commercial Travelers' Home, an opera house, and the Casino. Binghamton ranks as the third cigar-manufacturing city in the United States, and according to the census of 1890 it then had 704 manufacturing establishments, employing \$9,058,651 capital and 10,191 persons; paying \$4,349,162 for wages, and \$7,659,207 for material, and having a combined output valued at \$15,040,152. Other important manufactures are scales, chemicals, furniture, sheet-metal work, glass, gloves, and refined oils. An interesting feature of the city is the large number of cottages owned by the working people. Binghamton received a city charter in 1867. Pop. (1900) 39,647.

Bingley, Ward, Dutch actor: b. Rotterdam, of English parents, 1755; d. The Hague, 1818. In 1799 he made his debut on the stage of Amsterdam, and almost from the first took his place at the head of his profession, not only in the Dutch theaters, but also in those which performed French plays in Amsterdam and The Hague.

Bingley, England, a parish of the west riding of Yorkshire, containing a town of the same name, on the Aire, $5\frac{1}{2}$ miles north-west of Bradford. The town contains the interesting church of All Saints (restored 1871) in the Perpendicular style, several other places of worship, an endowed grammar-school, and a mechanics' institute. The chief industry is worsted-spinning. Pop. (1901) 18,448.

Bintang, bing-tang', an island of the Rhio-Linga group, in the Malay archipelago. Mount Bintang, its highest peak, 1,368 feet high, is in lat. $1^{\circ} 4' N.$, lon. $104^{\circ} 28' E.$; Rhio, the Dutch free port, is in lat. $54' 40'' N.$, lon. $124^{\circ} 26' 30'' E.$ Area of the island, 403 square miles; pop with Rhio, situated on Tanjong Pinang, an adjoining islet, about 20,000. The geological formation is granite, overlaid with cellular clay ironstone. Iron and tin are found, but not as yet extensively mined. The gambier plant (*uncaria gambier*), which produces terra japonica, is the chief product of the island. A large number of gambier plantations are cultivated by Chinese colonists, who cultivate black pepper at the same time; the refuse leaves of the gambier, after obtaining the coagulated decoction of commerce, being excellent manure for the latter plant. Other productions are cocoa-palm, durian-fruit, much prized by the natives, caoutchouc, gutta-percha, and damar. Many valuable timber trees are found on the island. The native

Malays, who are rude hunters and fishermen, like the Orang Benua of the Malay peninsula, are now outnumbered by the enterprising Chinese.

Binion, Samuel A., American scholar and author: b. Balvirziski, province of Suwalki, Poland, 1 May 1842. He was educated at the universities of Breslau and Padua and in King's College, London; was a reader in the British Museum and a superintendent of schools in Seville and the Balearic Islands; and was for several years connected as a post-graduate with the Johns Hopkins University in Baltimore, where he also catalogued the works on Oriental languages in the Peabody Museum. He has contributed to current encyclopedias, translated from the Polish Sienkiwicz, 'Quo Vadis,' 'With Fire and Sword,' and 'Pan Michael,' and published 'Ancient Egypt, or Mizraim.'

Binmaley, bin-ma-lá'ë, Philippines, a town of the province of Pangasinan, Luzon, situated on the Gulf of Lingayen, in the western part of the Island of Luzon, only a few miles east of the town of Lingayen. Pop. 13,787.

Binney, Amos, American merchant and naturalist: b. Boston, Mass., 18 Oct. 1803; d. Rome, Italy, 18 Feb. 1847. He graduated at Brown University in 1821, engaged in business with success, and devoted his leisure to natural science. He was one of the founders, and at the time of his death, president, of the Boston Society of Natural History. His writings on the land shells of America are in the 'Journal' and 'Proceedings' of that society. His chief work, 'Terrestrial and Air-Breathing Mollusks of the United States and Adjacent Territories of North America' (3 vols. 1847-51) was issued under the direction of Dr. A. A. Gould.

Binney, Hibbert, Canadian clergyman: b. Nova Scotia, 12 Aug. 1819; d. 1887. He graduated at Oxford University in 1842. He became bishop (Anglican) of Nova Scotia and Prince Edward Island in 1851, this being the first instance of England founding a bishopric in her colonies. He attended the General Convention of the Protestant Episcopal Church held in Chicago in 1886.

Binney, Horace, American lawyer: b. Philadelphia, 4 Jan. 1780; d. 12 Aug. 1875. He graduated at Harvard in 1797, and for many years was at the head of the Pennsylvania bar. He had a number of distinguished cases in his career; the most noted one being the defense of the city of Philadelphia against the executors of Stephen Girard. He was a member of the 23d Congress; and a director in the United States Bank. He wrote many valuable papers, and was the author of 'The Leaders of the Old Bar of Philadelphia,' 'The Privilege of the Writ of Habeas Corpus Under the Constitution,' and 'Reports of Cases in the Supreme Court of Pennsylvania' (6 vols.).

Binney, Thomas, English theologian: b. Newcastle-on-Tyne, 1798; d. 1874. He was pastor of Weigh House Chapel, London, for 40 years, and was a voluminous writer on polemical subjects, his most successful ventures as an author being the hymn 'Eternal Light! Eternal Light,' and 'Is it Possible to Make the Best of Both Worlds?' a work for young men.

BINNIE — BIOGRAPH

Binnie, Sir Alexander R., English civil engineer: b. London, 26 March, 1839. He was educated at private schools. He worked on Welsh railways 1862-6, and for the Indian Public Works Department 1868-74; was engineer of the city of Bradford 1875-90; constructed the Nagpore waterworks, the Black-wall tunnel, the Bradford waterworks, the Barking Road Bridge, etc. In 1897 he was made chief engineer of the London County Council. His publications include articles and reports on professional subjects, lectures on waterworks, papers on rainfall, etc.

Binns, Charles Fergus, Anglo-American ceramic expert: b. Worcester, England, 4 Oct. 1857. A son of the director of the Royal Porcelain Works in his native city, he was superintendent of various departments there, 1872-97. Leaving England in the last named year he was principal of the Technical School of Science and Art, Trenton, N. J., 1897-1900, and since June, 1900, has been director of the New York State School of Clay Working and Ceramics. He has written 'Ceramic Technology' (1896); 'The Story of the Potter' (1897).

Binocular Microscope, etc. See MICROSCOPE; OPERA GLASS; TELESCOPE; etc.

Binomial, in algebra, a quantity consisting of two terms or members, connected by the sign + or —. The binomial theorem is the celebrated formula which shows how to obtain any power of a given binomial, as $a + b$, from the two terms, a and b , and the exponent of the power. This theorem, frequently called the Newtonian theorem, on which the system of analysis is principally founded, was known, as far as relates to integral positive exponents, to several mathematicians before Newton. But Newton was the first who taught its application to fractional and negative exponents; and this discovery, one of the most important of those made by that great man, is engraved upon his tombstone.

Binondo, Philippines, a native town near Manila, on the right bank of the Pasig; now a suburb of the walled European city, having been annexed to it by a magnificent stone bridge 411 feet in length. The bridge of Binondo is regarded as the most remarkable structure ever erected by Europeans in the Indian archipelago.

Binturong, a large civet of the Malay Peninsula and Islands, which spends its life in the trees, where it is assisted in climbing about by its long, bushy, prehensile tail. It passes the day asleep in the top of a tree, and travels about at night in search of small mammals, birds, etc., but also eats leaves and fruit. It is gray when young, but black when fully grown, and reaches a length of two and a half feet, exclusive of its long tail.

Binue, bin'wě, or **Benue**, Africa, the largest and most important tributary of the river Niger. See **BENUE**.

Binyon, Laurence, English poet: b. Lancaster, 10 Aug. 1869. He has been an assistant in the British Museum from 1893. Besides editing the 'Shilling Garland' (1895-8)

he has published 'Lyric Poems' (1894); 'Poems' (1895); 'London Visions' (1895-8); 'The Praise of Life' (1896); 'Porphyrion and Other Poems' (1898); 'Western Flanders' (1898); 'Odes' (1900); 'Catalogue of English Drawings in the British Museum' (1898-1902); 'Dutch Etchers of the 17th Century'; 'Lives of John Crome and John Sell Cotman.'

Biobio, be'ō-be'ō, Chile, an eastern province with the Argentine Republic on the east, and the province of Concepcion on the west and north. It is well-wooded, and there is a good trade in timber; the river Biobio (qv) flows through it, and the railroad from Concepcion to Angol crosses the western part. Capital, Los Angeles; area, 4,158 square miles, pop. 122,729.

Biobio, the largest river of Chile. It has a west-northwesterly course of about 200 miles, from near the volcano of Antuco in the Andes to Concepcion on the Pacific Ocean. It is two miles wide at its mouth, and is navigable for 100 miles.

Biogenesis, the genesis or origin of all living beings from living beings. It is opposed to abiogenesis, which implies that at the present time the simplest, lowest forms of life may arise by spontaneous generation (qv.). Biogenesis, or biogeny, is divided into *ontogeny* (qv.), or the development of any individual organism, and *phylogeny* (qv.), or the development of the class or other group of organisms, to which the individual belongs. Biogenesis also may be extended to comprise the different modes of reproduction (qv.) whether sexual, or asexual, or by fission or budding. The principle of biogenesis was first placed on a scientific basis by Harvey, who demonstrated that living beings arise from eggs, as stated in his famous aphorism, *omne vivum ex ovo*. As now modified all organisms are known to arise from living matter, that is, either from germs, spores, seeds, or eggs. See **EMBRYOLOGY**.

Biogenetic Law. See **RECAPITULATION THEORY**.

Biograph, an apparatus that displays in rapid sequence a long series of photographs. It belongs to a class of apparatus which followed the invention of the kinoscope, and includes the vitascope, cinematograph, phantoscope, etc. It differs from the kinoscope in that instead of showing small pictures through an enlarging lens by reflected light, it projects them on a screen.

The biograph may be described as a stereopticon combined with such mechanism as is requisite for the precise manipulation of the celluloid picture film. When the apparatus is set in motion the long band of celluloid passes quickly, though not continuously, behind the projecting lens, between spools or bobbins which revolve at a uniform rate. While thus passing from its original spool to the winding reel the film encounters certain pulleys and toothed rollers that serve to direct its movements accurately. Along its edges are numerous small perforations into which the teeth of the rollers fit with precision, and by this means the small transparencies are made to occupy exactly similar positions when their images are projected

BIOGRAPHY

upon the canvas. As each picture in its turn attains this critical position it is momentarily brought to a standstill. At the same time a shutter is opened and an image of the picture flashes for an instant upon the screen. The shutter is then quickly closed, the picture resuming its motion, while its successor in the series is brought into a similar fixed situation. This temporary stoppage of the film (or rather of a portion thereof), as each picture attains its proper place behind the projecting lens, is a very essential feature of the process.

At the instant of its arrival a portion of the film on the preceding side of the picture will be in an unstrained or slack condition. The "slack" is then taken up by a continuously moving sprocket pulley, whereupon a rod or roller is quickly brought to bear against the now tightened film, pressing it to one side and as quickly releasing it. By this movement the next picture is pulled into its fixed position, while the film is made taut (or nearly so) on the following side of this picture. These operations are repeated continuously until the entire film has passed through the holding device in rear of the lens.

The camera used in taking the negative from which motion pictures are made is provided with a similar mechanism to that employed in showing the finished photographs. The picture roll is replaced by a roll of sensitized film, upon which the exposures are made at the rate of from 25 to 50 per second. The films range in length from 50 to 200 feet, and contain, when finished, from 800 to 3,000 negatives. After the film has been subjected to the usual photographic operations it is made to pass, in contact with a second sensitized film, beneath an incandescent lamp, and by this means the photographs are printed upon the sensitized surface. This second film is then in turn passed through the various photographic processes, and when complete it is wound on a spool which may then be placed in the machine used for exhibiting the pictures.

Biography, in its general sense, literature treating of the lives of individuals; in its restricted meaning the history of a person's life. When composed by the subject of the narrative it is called an autobiography. Biography has existed in one form or another from the most ancient times. In the book of Genesis there are biographies, or at least memoirs of Adam, Noah, Abraham, Isaac, Jacob, Joseph, and others. Homer's 'Odyssey' may be considered as an extended biography of Ulysses, limited, however, to the most interesting period of his life, that of his wanderings. Though the 'Iliad' may be loosely called a history of the Trojan war, yet, accurately, it is a chapter from the biography of Achilles, describing calamities he brought upon the Greeks by the revenge which he took on Agamemnon for carrying off his female captive Briseis. The most elaborate Greek biography was Plutarch's 'Parallel Lives' ('*Bioi Paralleloi*'), consisting of 46 memoirs of Greek, Roman, and other celebrities: it was published about 80 A.D. In 44 B.C. Cornelius Nepos had sent forth a biographical work, his '*Vitæ Imperatorum*' ('Lives of Commanders'). Under

the Greek and Roman civilization, however, the individual was absorbed in the state. When Cincinnatus or Coriolanus is mentioned, we recall rather an act than a person. The elder Cato wrote a history of the Roman republic, in which there was not found a single proper name. He said simply: "The consul proposed such a law, the general gained such a battle."

Biography differs from history, properly so called, in considering public and national events, if at all, only in their relations to a single personage. It assumes various forms, being sometimes most interested in the circumstances and external career, the *curriculum vitæ*, of its subject; sometimes regarding chiefly intellectual and moral qualities and development; sometimes being hardly more than a catalogue of a man's positions and changes of position; and sometimes, like the autobiography of Goethe, fit to be entitled truth and poetry; sometimes being formally narrative throughout, but often presenting the hero also by his letters and notes of his conversation. A biography may be a panegyric or a diatribe, or the life of a man may be used as only a frame on which to attach moral reflections. Its true aim, however, is to reveal the personal significance of those men who have played a distinguished part in the world, either by action or by thought. History has reference to the development of principles, biography to that of character. To observe the growth of a nation, or of any institution from the idea on which it was grounded, through its vicissitudes and conflicts, is the part of history. To trace a human life, to remark the manifold efforts, defeats, triumphs, perplexities, attainments, sorrows, and joys which fill the space between the cradle and the grave, is the province of biography. In history, Scipio at the head of the Roman legions subdued Africa, and Agesilaus struggled against the misfortunes of his country; in biography, the former is seen not only gaining victories, but also gathering cockleshells on the shore, and the latter not only fighting after defeat, but also riding on a hobby-horse among his children. Plutarch says it does not follow because an action is great, that it therefore manifests the greatness and virtue of him who did it; but on the contrary, sometimes a word or a casual jest betrays a man more to our knowledge of him than a battle fought wherein 10,000 men were slain, or sacking of cities, or a course of victories. Xenophon remarks that the sayings of great men in their familiar discourses, and amid their wine, have somewhat in them which is worthy to be transmitted to posterity.

Modern biographical literature may be considered to date from the 17th century since which time individual biographies have multiplied enormously. Dictionaries of biography have proved extremely useful. Moreri's 'Historical and Critical Dictionary' (1671), being, perhaps, the first of this class. During the 19th century there were published the 'Universal Biography' (85 vols. 1811-62); 'New General Biography' (46 vols. 1852-66); Chalmers's 'General Biographical Dictionary' (32 vols. 1812-17); Rose's 'Biographical Dictionary' (12 vols. 1848-50); Leslie Stephen's 'Dictionary of National Biography' (completed in 63 volumes, the first of which appeared in January 1885, and the last in September 1901); Appleton's 'Cyclopædia of American Biography' (7 vols.

BIOLOGY

1887-1900); White's 'National Cyclopædia of American Biography' (New York); 'Men and Women of the Time' (London); 'Who's Who' (London); 'Who's Who in America' (Chicago); Adams' 'Dictionary of American Authors' (1901); Vapereau's 'Universal Dictionary of Contemporaries' (Paris); 'Lamb's Biographical Dictionary of the United States' (8 vols. 1897, *et seq.*); and 'Canadian Men and Women of the Time.' Among works of more limited aim may be noted various 'Lives of the Saints'; Fox's 'Book of Martyrs'; various 'Lives of the Poets'; Boswell's 'Life of Johnson' (1791); the most noted of all English biographies, Lockhart's 'Scott' (1836-8); Forster's 'Dickens' (1872-4); Gaskell's 'Charlotte Brontë'; Cross' 'George Eliot' (1884); Lonsdale's 'Sister Dorothea' (1878); 'Life of Tennyson,' by his son (1897); 'Life of Huxley,' by his son (1901). Among notable autobiographies are the first Lord Herbert of Cherbury's 'Autobiography'; Benvenuto Cellini's 'Vita da lui Medesimo Scritta'; Rousseau's 'Confessions'; Gibbon's 'Memoirs'; Franklin's 'Autobiography'; Newman's 'Apologia Pro Vita Sua'; Besant's 'Autobiography' (1902); Trowbridge's 'The Story of My Life' (1903); Mrs. Oliphant's 'Autobiography' (1899).

Biology. The study or science of living organisms, and the phenomena of life. Its field is the whole breadth of the organic world, and it seeks to mark the boundaries which separate living from inorganic nature,—to discover the principles that unify it, the processes by which living things have developed, the nature of life itself and the future in store for it. Biology, then, is the sum of all the special departments of study which deal with plants, animals, and man in his animal relations, such as botany, zoology, anthropology, and their subordinate or associated sciences; that is, bacteriology, microscopy, physiology, and many more. In his out-reaching toward the causes and principles underlying its phenomena, the philosophical biologist must therefore understand organic chemistry, and the laws of electricity, light, heat, and mechanics, as they relate to animal needs; and at the other extreme he must consider psychology as an integral part of his domain.

This array of responsibilities and of objects for investigation seems too formidable for any one mind to undertake or a lifetime to encompass, and it would be were not the realm of living nature capable of resolution into simple elements; unified in its fundamental structure; and controlled in its developmental growth by definite "laws of being," which have come more and more clearly into view as knowledge of details has increased. The classification and co-ordination of the enormous mass of facts incessantly poured into his laboratory and library by experimenters and observers, to illuminate the truth by some generalization, or to exhibit a plan, law, type of structure, or growth, is the high purpose of the thoughtful biologist; and the greatest names in the science.—Aristotle, Leibnitz, Harvey, Malpighi, Linné, Buffon, Lamarck, Treviranus (who in 1802 first used the term *biology*), Cuvier, Galvani, Goethe, Lyell, Von Baer, Owen, De Blainville, Leuckart, Agassiz, Darwin, Wallace, Kowalewsky, Muller, Haeckel, Marsh, Cope, Hyatt, Weismann, and many others,—have been those of men who had

these large aims in view, and have contributed toward a solution of the great problem of life. The living world may be pictured as an enormous bundle of tangled and interlaced cords of phenomena, which, moreover, are never quite stationary and fixed, but are always slowly, invisibly, altering and forming new entanglements. Every naturalist is at work upon some part of this bundle, endeavoring to extricate his particular part. In those cases he pays so little attention to anything else, and is so fascinated with the beauty of his single strand, that he draws but little out. In other cases men of larger view or more serious purpose, or societies of them co-operating, disentangle more. The great biologist is he who can perceive those who have found a clue, and is able to teach them and the others how still more surely to unravel the intricate threads of phenomena that entwine and conceal the great fact of life at the centre of the puzzle.

To drop the figure, the science of biology in its more restricted and ordinary meaning, is the co-ordination of the observed facts and manifestations of the organic world into laws, and the discovery of the principle from which all proceed; that is, its object is to find an answer to the ever-present question of existence—What is Life? To this end goes on the incessant collection of facts in natural history, and it goes on joyously because any moment the biologist may come upon some fact or suggestion which shall contribute to the grand result.

Progress has been made. The study at first was nothing but a miscellaneous gathering of specimens and records of observations. Then a crude sorting out began. Men at first failed to distinguish between what was animate and what was inert. The winds, the lightning, volcanoes, springs were things of life. Later the broad distinction of organic from inorganic was perceived, but even now it is not known whether some of the manifestations of movement and response in certain "slimes" are purely chemical, or due to the presence of actual life.

The next step was the separation of the two great branches of the organic world—plants and animals. The broad features of these groups must have been apparent to primitive man, but it is only within comparatively recent years that such groups as the sponges, the branching forms of the corals, the spreading growths of the polyzoans, have been definitely placed among the animals. The names, "sea-anemone," "moss-animal," "zoophyte," and the like, show the popular error or doubt as to these forms. The relationship of the minute or even microscopic hydroids and protozoans were still longer in doubt; and to this day there is a borderland in this great group (the Protozoa) of minute, unicellular objects where no one is able to draw a certain line between what should be called a plant and what an animal, or even whether some of the objects are organic at all.

As men perceived certain likenesses and unlikenesses the sorting of plants and animals went on crudely at first, on purely superficial or even fanciful grounds. This sufficed fairly well for some large and well-marked groups, as beasts, birds, fishes, insects, hardwood trees, and the like, yet led to many mistakes, such as placing whales with the fish, and the bats with birds. Meanwhile students here and there had

BIOLOGY

become interested in special groups, and each called his pursuit a science. Thus arose Ornithology—the study of birds: Conchology, the study of shells (in which for a long time little attention was paid to the animal that made them!); Anatomy and Physiology, the study of structure, at first confined wholly to the human form, and only lately to animals in general, when it was distinguished as Comparative Anatomy; Botany, the study of plants, and so on. In each men gathered and recorded specimens and facts, as a rule from a single neighborhood. Nevertheless, curiosity began to inquire beneath the surface. Plants were pulled apart, animals dissected, and resemblances and contrasts of structure were noted. Naturalists traveled, and found that the creatures of the world were more numerous than had been suspected, and varied with climate, soil, height above the sea, and diverse conditions, and when records and specimens from many localities were gradually accumulated in great museums, likenesses and contrasts appeared that had not been visible in the small local cabinet. Materials were thus obtained for more intelligent arrangement, and classification became one of the most important sciences in the scope of biology. The great service an accurate arrangement of living things would render to an inquirer as to their nature, was perceived, and scientific men everywhere searched for facts which should fill the gaps in their knowledge. The criteria were made more and more exact, and as classification was perfected it became increasingly evident that the criteria for all branches were substantially similar, and there came to be perceived certain *plans of structure*. One of the latest and most powerful aids to investigation, the result of the perfecting of the microscope, was the science of Embryology, or the study of the development of a plant from the seed or of an animal from the egg. It went hand in hand with Histology, the study of tissues, and both disclosed the new truth that the structure of both animals and plants was at its basis the same—a cell filled with “life substance” (protoplasm); and that the multiplication of these cells constituted the growth, and their arrangement and limit the form and bulk, of every animal and plant. It was furthermore ascertained that an egg or a seed (in which it is believed that every animal plant begins, in spite of some apparent exceptions) was simply a cell differing, so far as we can yet see, from other cells in the body only by its possession of the potentiality of independent life under the fostering of suitable conditions. Classification had already shown that its groups might be arranged in something like a series from those very simply organized (the one-celled protozoa at the foot of the list) up to the highly complex. Now embryology showed that the changes each individual passed through from egg to birth were a series of changes from simplicity to complexity and furthermore that they suggested a parallel to the features of the successive groups in classification, especially to those of the subordinate ranks of the subject's own class. Palæontology enforced this by a similar parallel, finding that the most ancient animals fossil in the rocks were of simple and generalized structure as compared with those of more modern geological formations: in other

words, that structural development has also been historic development.

All these facts changed the point of view of the biologist. Instead of looking at separate animals and seeking to find differences upon which to make new species and subdivide groups, he is now seeking for likenesses—points of unity. It was long ago suggested to thoughtful minds that the world was not always as we found it, but that for a vast period there had been a slow, persistent growth and unfolding. The phenomena of the inorganic world pointed the same way, and hence arose the “nebular hypothesis”—the explanatory theory that the universe developed from a gaseous state, and the earth, as one of its parts, was slowly perfected in pursuance of the forces inherent in its origin. Biologists are only carrying this theory out in a detail when they argue that the facts in their hands can be accounted for only by the supposition that the living beings on the earth have been slowly developed from a primitive source, comparable to the germ-cell, along unequal and ramifying lines of progress under the influences of their changeable environment. This is only a detail,—a flower,—of the general unfolding of the universe which is well called its evolution; it is an *organic* evolution.

In the light of this grand generalization biology is now progressing with an organized force for investigation of the great question as to the origin and nature of life. This has not been answered by any of the fruitful hypotheses, like those of Darwin or Lamarck, which have placed so effective tools in the biologist's hands. Toward the solution of this problem all scientific men are working, consciously or unconsciously. In aid of this purpose are pushed forward the incessant and world-wide collection and preservation of preserved animals and plants—museum specimens; and the systematic and accurate observation and record of local species and their habits and instincts. Much of this seems trivial and dry as dust in the eyes of the ignorant or of those whose minds, being occupied with other thoughts, forget the reason and tendency for these ever-multiplied details of natural history. Patient students toil to the same end in laboratories of anatomy and microscopy, laboriously gather statistics of variation, compile lists of geographical distribution, chisel out of the rocks remains of extinct races, and sort and re-sort in experimental classifications—all this in order to provide the generalizers of the science with more and better factors for the solution of the great focal problem, What is Life, and how came it to be? What has been the net result so far? In one direction the conviction of the universal eminence and force of the principle of evolution, in another the realization of the independent life and action of each separate cell. To the study of the constitution, qualities and behavior of the cell, whether standing alone in the unfertilized egg, or as a naked monad, or one in an interdependent association of millions building up a complex organism, has biology come at last; and not until it has vanquished the difficulties presented by this atom of living and potential protoplasm, the cell, will it accomplish its full purpose.

ERNEST INGERSOLL,

Editorial Staff (*Encyclopedia Americana*.)

BION OF ABDERA—BIOT

Bi'on of Abdera, Greek mathematician: lived about 400 B.C. He belonged to the family of Democritus, and is said by Diogenes Laertius to have been the first who taught that there were countries in the world where the year consists only of a single day and a single night, each lasting for six months. He must therefore have been acquainted both with the spherical form of the globe and the obliquity of the ecliptic. Unfortunately nothing more is known of his history.

Bion of Borysthenes, Greek philosopher contemporary with Erastosthenes (born 275 B.C.), and with Zeno the Stoic. He studied philosophy at Athens, first under Crates of the Cynic school, then took lessons of Theodorus, surnamed the Atheist; and at last, considering his studies completed, set up for himself. It is not easy to ascertain what his opinions were, as only a few fragments of his numerous writings have been preserved; but he was accused of Atheism, and apparently on good grounds, as he is said to have regarded all questions relative to the nature of the gods and divine providence as indifferent. He died at Chalcis in Eubœa about 241 B.C.

Bion of Smyrna, Greek pastoral poet, who flourished in the latter part of the 3d century B.C. He was a contemporary of Theocritus whose manner he imitated. On attaining manhood, Bion emigrated to Sicily, where a conspiracy was formed against him, and he was basely poisoned. The poems of Bion were chiefly pastoral, occasionally erotic. The fragments of them that are extant fully justify the eulogies of his admirer, Moschus. Their sentiments are tender and delicate; their style is copious, graceful, and polished. Seventeen short poems and the famous 'Lament for Adonis' are preserved to us, the last-named furnishing the model for Shelley's 'Adonais.' See Smyth, 'Greek Melic Poets' (1900).

Biondo, Flavio, byōn'dō, fla'vyō, Italian archæologist: b. 1388; d. 1463. His encyclopædias have served as the foundation for all subsequent collections of archæological knowledge. They were called 'Roma instaurata,' 'Roma triumphans,' and 'Italia illustrata.'

Bionomics, in biology, the study of the habits and modes of life, and their relations to each other, to all living beings, and to the world around them. It corresponds to "ecology" and to "biology," as used by German naturalists. Wasmann defines biology in the restricted sense of bionomics as—

"The science of the external conditions of existence, which pertain to organisms as individuals and at the same time regulate their relations to other organisms and to the inorganic environment."

It therefore, he says, embraces in its restricted sense—

"First, a knowledge of the mode of life of animals and plants, their nourishment, dwelling, mode of propagation, the care of offspring and their development, in so far as these present external manifestations, hence also, second, a knowledge of the life-relations that obtain between individuals of the same and different species (including all the phenomena of parasitism, symbiosis, etc.), and hence also, third, a knowledge of the conditions of existence which are essential to the life and maintenance of animals and plants."

By conditions of existence are meant the action on plants and animals of climate, soil, light, gravity, heat, the dryness or moisture in the air and soil: the nature of the water, whether salt,

fresh, or brackish; currents of air, and of water; elevation above the sea, also any other physical and biological agents in causing variation in or the modification of organisms. As Wheeler states:

"Whenever we undertake the detailed or exhaustive study of an ethological problem, we are led imperceptibly into the details of physiology, morphology, embryology, taxonomy, or chorology, according to the particular aspect of the subject under consideration."

Many of these subjects, falling under the head of bionomics, are treated under the head of evolution (q.v.), as the struggle for existence, mimicry, etc. Another department of bionomics is geographical distribution, and distribution in time, together with migration, heredity, hibernation, and seasonal dimorphism. The word "bionomics" seems preferable to "ethology," which has been used as the name of the science of ethics; it is also the more comprehensive term.

Consult papers by Bessey ('Science,' XV. p. 593); Bather ('Science,' XV. p. 748), Wheeler ('Science,' XV. 20 June 1902). The writings of Réaumur, Audubon, Huber, Lubbock, Plateau, Fabre, Ford, Wasmann, Riley, Wheeler and others deal especially with the habits and economy, or bionomics of insects (bees and ants) and birds.

Bi'oplasm, that portion of the protoplasm in living bodies that possesses the physiological qualities of life. This term was first used by Prof. L. S. Beale, an English scientist, the word protoplasm had formerly been used in an analogous sense, but Prof. Beale considered that a much wider meaning had been given to this latter term by Huxley and others and therefore introduced the use of the word bioplasm with its narrower signification.

Biot, Edouard Constant, be-ō, ā-doo-ar kōn-stan, French Chinese scholar of eminence: (son of Jean Baptiste Biot) b. Paris, 2 July 1803; d. 12 March 1850. After accompanying his father on a scientific tour to Italy in 1825-6, he undertook the construction of a railway from Lyons to St Étienne, the first in France. In 1833 he retired from active life, and devoted his leisure to the study of the Chinese. He was the author of 'Causes de l'Abolition de l'Esclavage Ancienne en Occident' (1840). As the result of his studies on China he published numerous articles in the 'Journal des Savants' and 'Journal Asiatique,' as well as several larger works, more especially 'Dictionnaire des Noms, Anciens et Modernes, des Villes et Arrondissements compris dans l'Empire Chinois' (1842); and 'Essai sur l'Histoire de l'Instruction Publique en Chine' (1847). Besides translations of Chinese works,—for example, the historico-chronological 'Tcheou-chou-ni-kien' (Paris 1842), and the 'Astronomical Tcheou-peï,'—he wrote a 'Notice sur quelques Procédés Industriels connus en Chine, au 17me Siècle'; an 'Examen de diverses Séries de Faits relatifs au Climat de la Chine'; and 'Chine et Indo-Chine.' The printing of his translation of the Chinese Imperial Geography, 'Tcheou-li,' was interrupted for some time by his death.

Biot, Jean Baptiste, be-ō, zhōn bāp-test, French mathematician and physicist of distinction: b. Paris, 21 April 1774; d. there, 3 Feb. 1862. He was educated at the Collège

Louis-le-Grand, and in 1793 entered the artillery service. Shortly afterward he entered the École Polytechnique, and thenceforth devoted himself to the study of mathematics and the natural sciences. After teaching physics for some years at Beauvais, he became professor of the same subject in the Collège de France in 1800, and in 1803 was elected a member of the Institute. In 1804 he made a balloon ascent with Gay-Lussac, and in 1806 was made a member of the Bureau des Longitudes. In 1809 he became also professor of physical astronomy in the University of Paris. With the exception of three journeys, undertaken in connection with the measurement of a degree of the meridian, — namely, to Spain in 1806-8, to Scotland, Orkneys, and Shetland in 1817, and to Spain and Italy in 1824-5, — his whole life was quietly passed in study and teaching. He published some excellent text-books, which became widely known beyond France, such as the 'Essai de Géométrie Analytique'; 'Traité de Physique Expérimentale et Mathématique'; and 'Traité Élémentaire de Physique Expérimentale,' as well as works on the astronomy of the ancient Egyptians, Indians, and Chinese. His most valuable contributions to science, however, are chiefly contained in communications to learned societies and periodicals. There are few branches of physics which were not advanced by his labors; and in optics especially he made some valuable investigations, particularly in connection with refraction and polarization. See CURVES

Bi'otite, a mineral of the mica group, having its characteristic monochinic crystallization and very perfect cleavage. Its chemical composition varies widely, but in general it may be said to be a silicate of aluminum, magnesium, iron, potassium; with hydrogen. On account of the presence of magnesium, it is sometimes called "magnesia mica." In color, biotite varies from green to black. It has a hardness of from 2.5 to 3, and a specific gravity of about 2.9. It is a common constituent of granite and gneiss, and of many eruptive rocks, such as andesite and trachyte. Biotite was named for the French physicist, J. B. Biot (q.v.).

Bipen'nis, a double-headed battle-axe, mentioned in Homer. The Greek literature attributes its use to the barbarians, most especially to the Amazons. Such axes have been found in stone.

Bipelta'ta, a name given by Cuvier to a family of *Crustacea*, so called because the carapace is divided into two parts or shields; the anterior shield is large, oval in shape, and corresponds to the head; the posterior is angulated in outline, corresponds to the thorax, and bears the foot-jaws and ordinary feet. This family is one of those making up the order *Stomopoda*, and is now very generally known under the name of *Phyllosomidae*.

Bipes, bīpēz, (1) a genus of reptiles belonging to the order *Suaria*, in which the posterior feet only are visible, though the rudiments of the anterior extremities appear under the skin. This genus is the connecting link between the lizards and the snakes. (2) The name given to a lizard from the Cape of Good Hope, which is called *Anguis bipes* by Linnæus and *Scelotes bipes* by Gray.

Bipont Editions, famous editions of the Latin classics, published in Bavaria in the city of Deux Ponts, whose name in German is Zwei-brücken, and in Latin Bipontium. The publication was begun in 1779, but after the French conquest was finished in Strasburg. The collection forms 50 volumes octavo.

Birago, bê-râ'gô, **Karl, Baron von**, Austrian military engineer: b. Cascino, d'Olmo, 24 April 1792; d. Vienna, 29 Dec. 1845. He studied mathematics at Pavia; was a teacher in a military school in Mailand and in 1825 invented the military bridge which is named for him. He assisted at the building of the fortifications of Linz, the fortifications of the Po near Brescello and in 1839 built a military bridge across the Po which was especially successful. Nearly all the Continental armies have since adopted his system of bridge construction. In 1844 he was in command of the newly organized Pioneer and Pontonier Corps and became commander of a brigade. He wrote 'Researches in European Bridge Construction.'

Birbhum, bêr'boom, a district of the Division Bardwan in Bengal. It is crossed by a few unimportant rivers; has hot springs, iron mines and limestone deposits. The chief agricultural product is rice; there is also a large silk-worm industry. For over 2,000 years Birbhum was the scene of the conflicts of the Aryans advancing into Bengal from Hindustan.

Biquadratic Equations, in algebra, equations raised to the fourth power, or where the unknown quantity of one of the terms has four dimensions. An equation of this kind, when complete, is of the form $ax^4 + Ax^3 + Bx^2 + Cx + D = 0$, where A, B, C, and D denote any known quantities whatever. See EQUATION.

Bir, bêr, or **Birejik**, a town in Asiatic Turkey, 80 miles northeast of Aleppo, on the side of a steep hill on the left bank of the Euphrates, which is here about 600 yards wide, and 10 to 12 feet deep. The town is surrounded on the land side by a wall, with towers at the angles, and pierced with loopholes. The streets are narrow but clean. In the centre, on a steep rock, is an old ruined fortification. Bir has long been the point where caravans and travelers from Aleppo to Orfah, Diarbekir, Bagdad, and Persia, cross the Euphrates. Pop. 8,000.

Birague, René de, be-rag, re-nâ dè, Italian politician. b. Milan, 1507 (or 1506); d. 1588. He incurred the hostility of Louis Sforza the duke, but in France, Francis I. received him favorably, made him counselor of the Parliament of Paris, and governor of Lyonnois, and sent him to the Council of Trent. Under Charles IX. his advancement was still more rapid, and in 1570 he was made keeper of the seals. In this capacity he was a party in the secret council at which the massacre of St. Bartholomew was organized. He zealously defended the Catholic cause against the inroads of French Calvinism, both in its religious and its political aspects. He was bitterly hated by the Huguenots, who in consequence made many derogatory accusations against him. He was made a cardinal in 1578, and held the bishopric of Lavaur and several rich abbeys. He died chancellor of France.

Birch, Harvey, the principal figure in Cooper's novel, 'The Spy,' a romance of the American Revolution.

BIRCH

Birch, John, English soldier: b. 7 April 1616; d. 10 May 1691. A Presbyterian in religion, he took the side of the Parliament, acting as a captain of volunteers at the siege of Bristol by the Royalists. On the institution of the "new model" he was ordered to join the army of Fairfax and Cromwell in the west of England, and had Bath entrusted to his care. He commanded a body of horse and foot at the storming of Bristol, an affair in which he so highly distinguished himself as to receive special commendation from Cromwell in his report to the Parliament. In 1645 he was sent against Hereford, and by a stratagem succeeded in gaining possession of the city, and with this the special thanks of Parliament. He objected to many of the proceedings of the party of Cromwell, and was repeatedly thrown into prison. He took an active part in bringing about the restoration of Charles II, and in the latter part of his life was a prominent member of Parliament. He was a man of great personal strength and stature, a rough but most effective public speaker, and had remarkable talents for business and practical affairs.

Birch, Samuel, distinguished English Egyptologist: b. London, 3 Nov. 1813, d. there, 27 Dec. 1885. At the age of 23 he was appointed an assistant in the department of antiquities in the British Museum. He gradually rose to higher positions in the museum, and latterly became keeper of the department devoted to Egyptian and Oriental antiquities, a post which he retained till his death. His whole life was devoted to studies and work connected with his official duties, and was naturally uneventful. His labors did much to advance the study of Oriental archaeology, and his eminence in his own province was duly recognized by learned bodies and institutions. In 1870 he assisted in founding the Society of Biblical Archaeology, and became its first president, frequently contributing to its 'Proceedings' and 'Transactions.' In 1874 he successfully presided over the International Congress of Orientalists that met in London in that year. His studies ranged over a wide field, but it is on his eminence as an Egyptologist that his reputation chiefly rests. It has been said that "he found the language of Egypt a puzzle, and left it at his death in the position of one of the most important philologies of the world." Among his works, exclusive of contributions to learned societies, encyclopædias, etc., are: 'Introduction to the Study of the Egyptian Hieroglyphs' (to accompany Gardiner Wilkinson's work on Egypt: 1857); 'History of Ancient Pottery, Egyptian, Assyrian, Greek, Etruscan, and Roman' (1857); 'Himyaritic Inscriptions of Southern Arabia' (1863); 'Dictionary of Hieroglyphics and Grammar of the same in the fifth volume of the English edition of Bunsen's 'Egypt's Place in the Universal History' (1867); 'Guide to the Egyptian Galleries of the British Museum' (1874); 'New Edition of Wilkinson's Manners and Customs of the Ancient Egyptians' (1878). For full account of his life and work, see 'Transactions of the Society of Biblical Archaeology' Vol. IX. (1893).

Birch, Thomas, English historian: b. London, 23 Nov. 1705; d. there, 9 Jan. 1766. His early taste for reading induced him to prefer a literary life, which he was permitted to choose

on condition of supporting himself by his own exertions. He took orders in the Church in 1730, and obtained in 1732 a living in Essex. In 1734 he engaged with some coadjutors in writing the 'General Historical and Critical Dictionary,' founded on that of Bayle, and completed, in 10 volumes folio, in 1741. He subsequently obtained various preferments in the Church, and for about 20 years before his death held the rectories of St. Margaret Pattens, London, and Depden, in Suffolk. Birch had formed very extensive manuscript collections, which, together with his library of printed books, he bequeathed to the British Museum. He produced a large number of historical and biographical works in the course of his laborious life, and served as one of the pioneers of literature. He collected fully and faithfully, but without much discrimination, materials relating to the various subjects of his research, which are calculated to afford important assistance to writers possessed of more taste and judgment. Among his works are 'Life of the Right Honorable Robert Boyle'; 'Historical View of the Negotiations Between the Courts of England, France, and Brussels,' 1592-1617; 'Life of Archbishop Tillotson'; 'Memoirs of the Reign of Queen Elizabeth, from 1581 till Her Death'; 'History of the Royal Society of London'; 'Life of Henry, Prince of Wales.'

Birch, Thomas, American painter: b. London, England, 1779; d. Philadelphia, Pa., 3 Jan. 1851. Coming to the United States in 1793, he settled in Philadelphia, and painted chiefly portraits until 1807, when he took up marine painting, in which he achieved a high reputation. A number of his works represent naval battles of the War of 1812, and of these the paintings representing the engagements between the United States and the Macedonian, and between the Constitution and the Guerrière, are the best known. Both are in the Harrison collection at Philadelphia.

Birch-Pfeiffer, Charlotte, bērn'pfif-er, shar-lōt'fā, German actress and dramatic writer: b. Stuttgart, 23 June 1800, d. 24 Aug. 1868, her maiden name being Pfeiffer. She first appeared on the stage in her 13th year at Munich, and soon acquired a great reputation, her special role being that of the heroines of tragedy. In 1825 she married Christian Birch, a writer of some note. After playing with success at places as far apart as St. Petersburg, Amsterdam, and Budapest, in 1837 she took the management of the theatre at Zurich, and remained in this capacity till 1843. Next year she was engaged for the Theatre Royal, Berlin, and here she remained till her death. Her plays, mostly founded on novels, became well known on almost every stage in Germany, and gave evidence of real dramatic talent, as well as of a knowledge of stage effects and what would suit the taste of the theatre-going public. Victor Hugo's 'Notre Dame' and Charlotte Brontë's 'Jane Eyre' furnished her with materials for two of her dramas. She also wrote novels and tales. Her collected dramatic works appeared at Leipsic in 23 volumes (1863-80); her narrative writings in three (1863-5). Her daughter has become well known as a novelist under the name Wilhelmine von Hillern.

Birch (*Betula*), a genus of trees belonging to the natural order (or sub-order) *Betulaceae*,

BIRCH

which comprises only the birches and alders. The principal habitats of the trees of this order are North America, Europe, northern Asia, and the Himalayas. The common birch is indigenous throughout the north, and on high situations in the south of Europe. It is extremely hardy, and only one or two other species of trees approach so near to the North Pole. There are two varieties natives of Great Britain, *Betula alba*, and *B. alba pendula*, or weeping-birch, the latter by far the more valuable and ornamental. When a plant it may readily be distinguished by the touch, its bark being covered over with rough exudations, while that of the common tree is soft and velvety. Each variety is found exclusively in some districts, but frequently they are interspersed. Throughout the most remote parts of the Highlands of Scotland the birch is often found covering extensive tracts or rocky elevations, where no other ligneous plant is to be met with. It also grows in glens and ravines, adorning the margins of lakes and rivers, where the silvery whiteness of its trunk and the light and airy habit of its spray form beautiful and interesting pictures, even in the absence of every other tree. Though often found associated with the alder on swampy ground, yet few trees more successfully resist drought. Adapting itself to various soils and situations, it possesses a wider range than any other tree. It is well suited to form a cover on ground from which Scotch pine timber has been recently removed; the exuviae, which always overspreads such places, though hostile to plants in general, are favorable to the birch, which commonly springs up and becomes the successor of the pine. The common tree, where it grows wild, attains a height of about 30 feet, and the weeping variety about 40 feet; but both sorts rise to a much greater height when formed into plantations, particularly when interspersed with other trees. Although the birch is considered by no means a valuable tree, yet its wood, which is light in color, and firm and tough in texture, is used for a variety of purposes. Not long ago, in many parts of the Highlands, the birch may be said to have been the universal wood, and was used by the Highlanders for every purpose. They made their beds, chairs, tables, dishes, and spoons of it, and even manufactured ropes and horse-harness by heating and twisting its spray. The brushwood is used in forming wicker fences to prevent the inroads of cattle and sheep, in thatching cottages, and in forming brooms or besoms. The wood is largely used for fish-casks and hoops, and for smoking hams and herrings. Turners use it for trenchers, bowls, ladles, and other wooden ware. Ox-yokes, small screws, women's shoe-heels, pattens, and in France wooden shoes are made of it. Birch-trees are not unfrequently planted along with hazels, for the purpose of procuring wood to be converted into charcoal for forges. This charcoal is much esteemed, and the soot which is formed on burning the wood constitutes a good black substance for printers' ink. Nearly all the other parts are applicable to useful purposes. The bark is employed in the tanning of leather; and by fishermen for preserving their nets and cordage. In America, northern Europe, and Asia it is utilized for a great variety of purposes. The North America Indians use it for canoes, boxes, buckets, baskets, kettles, and dishes, curiously joining it together with threads made of roots of

the cedar-tree. It is serviceable in dyeing a yellow color. In Norway it is dried, ground, mixed with meal, and boiled with other food for swine. The houses or huts in many parts of the north of Europe are covered with the outward and thicker part of the bark, instead of slates or tiles. It is spun into a coarse kind of cordage, woven into shoes and hats, and in some places even made into drinking cups. The Laplanders fasten together large pieces of it to keep off the rain. Abounding in resinous matter, slices of the bark are sometimes tied together to make torches. During a scarcity of corn it has, in several instances, been ground with bread corn, and successfully used as food for men. The leaves afford a yellow dye. The sap, from the amount of sugar it contains, affords a kind of agreeable wine. Birch-wine is produced by the tree being tapped by boring a hole in the trunk, during warm weather, in the end of spring, or beginning of summer, when the sap runs most copiously. It is recorded that during the siege of Hamburg, in 1814, many birch-trees in that vicinity were destroyed in this manner by the Russian soldiers. The dwarf birch, *Betula nana*, is a low shrub, a native of parts of the Highlands of Scotland and of Arctic regions generally. It is never more than two or three feet high, and is generally much less; a full-grown plant being thus a very tiny example of a tree. It is used as fuel, and as stuffing for beds, and its seeds furnish food for ptarmigan and other birds. A similar species is a native of the Antarctic regions. Among the black birch, or river birch of North America (*B. nigra*), grows to the height of 70 feet, and produces hard and valuable timber. It is also known as the red birch, from the redness of the bark in the young trees. Another American species, the cherry birch or sweet birch (*B. lenta*), is also called the black birch. It grows to a similar height with the preceding, and yields even more valuable timber, used in making furniture, etc., being tough, fine-grained, and taking on a good polish. It has been introduced into Great Britain though not much known there. The paper birch (*B. papyracea*) is another American species which also attains a large size, and by some is regarded as a mere variety of the white or common birch. Its habitat extends within the Arctic Circle, but it becomes rare and stunted in the extreme north. It receives its name from the fact that thin strips of the brilliant white bark are sometimes used as a substitute for paper. The bark of this species is put to perhaps a greater variety of uses than that of any other, its wood and sap being also utilized. Another American birch is the yellow birch (*B. excelsa*), so named from the golden color of the outer bark. It is a large-leaved species, yielding timber used for ship-building, etc., and is a native of the eastern parts of Canada and the northeast of the United States. Of Himalayan species may be mentioned *B. bhojputra*, the Indian paper birch. Its thin papery bark has been used as paper from a remote period, and is still commonly used for packing purposes, for lining the flexible tubes of hookahs, and in other ways, while the wood is tough, and is employed in making articles of various kinds. In its native mountains it may be found at an altitude of 10,000 to 13,000 feet. Several of the pigmy species deserve mention. *B. pumila*, which is generally

less than 8 feet tall, but sometimes reaches a height of 15 feet, is found from Newfoundland to Minnesota, and south to Ohio. *B. glandulosa*, which extends from Labrador to Alaska and south to Michigan and in the mountains to Colorado, seldom exceeds 4 feet. *B. nana*, an Arctic species, common to all three continents, rarely reaches a height of four feet. Throughout its range it is an important fuel and its seeds form one of the principal foods of ptarmigan upon which the natives depend to a large extent for flesh food. Like the two other dwarf species mentioned, it is a favorite shrub for planting among rocks. Other species, natives of Europe and Asia, resemble the preceding more or less in appearance and uses. See Bailey and Miller, 'Cyclopædia of American Horticulture' (1900-2); Regel, 'Monographische Bearbeitung der Betulaceæ' (1861); DeCandolle, 'Prodromus 16' (1869).

Birchard, Isaac James, Canadian educator: b. Uxbridge, Ont., 11 Oct. 1850. He was principal of a public school in Toronto, 1874-80; master of mathematics at Brantford College Institute in 1882-93; and in 1900 was master of mathematics in the Toronto College Institute. He is best known as the author of the textbook, 'Plane Trigonometry for Schools and Colleges,' and as the joint author of 'High School Algebra.'

Birchenough, berch'e-nō, Mabel (BRADLEY), English novelist, third daughter of the late H. G. Bradley, dean of Westminster, and wife of Henry Birchenough, a writer on statistics. She has written: 'Disturbing Elements'; 'Pots-herds'; 'Private Bobs'

Bird, Arthur, American musician: b. Cambridge, Mass., 23 July 1856. He conducted the Milwaukee Musical Festival in 1886 and since that date has lived in Berlin. In addition to a symphony and various pianoforte numbers he has composed a comic opera, 'Daphne' (1897) and a ballet, 'Rubezahl.'

Bird, Charles, American military officer: b. Delaware, 17 June 1838. He entered the volunteer service in 1861, as first lieutenant, 1st Delaware Infantry; was promoted lieutenant-colonel, 9th Delaware Infantry, in 1864; and was commissioned colonel of the 1st United States Veteran Infantry, 24 Dec. 1865. On 2 March 1867 he was brevetted first lieutenant and captain in the United States army for gallantry in the battle of Fredericksburg, major for Spottsylvania, and lieutenant-colonel for Petersburg, Va. He was appointed a second lieutenant, 14th United States Infantry, in 1886; promoted to major and quartermaster in 1895; and commissioned a colonel of United States Volunteers for the war with Spain in 1898.

Bird, Edward, English painter of note: b. Wolverhampton, 12 April 1772; d. Bristol 1819. Being bound apprentice to a maker of tea-trays at Birmingham, his artistic tendencies found some outlet in the ornamentation of these articles. He next took up art as a profession, without any regular training, and carried on a school of drawing at Bristol. In 1807 he exhibited some pictures at Bath, and had the good fortune to find purchasers for them. In 1809 he had a picture, 'Good News,' in the exhibition of the Royal Academy, and so successful was this work that his name at once became known. He

was elected an associate of the Academy in 1812, and his reputation was increased by such paintings as the 'Surrender of Calais,' the 'Death of Eli,' and the 'Field of Chevy Chase'—the last considered his greatest work. The 'Death of Eli' was sold for 500 guineas, and was awarded a premium of 300 by the British Institution. In 1815 he became a full member of the Royal Academy, and he was also appointed court painter to Queen Charlotte. Among his last pictures were the 'Crucifixion'; 'Christ led to be Crucified'; the 'Death of Ananias and Sapphira'; and the 'Burning of Ridley and Latimer.' His talents, however, were considered to be rather for genre than for historic or sacred subjects.

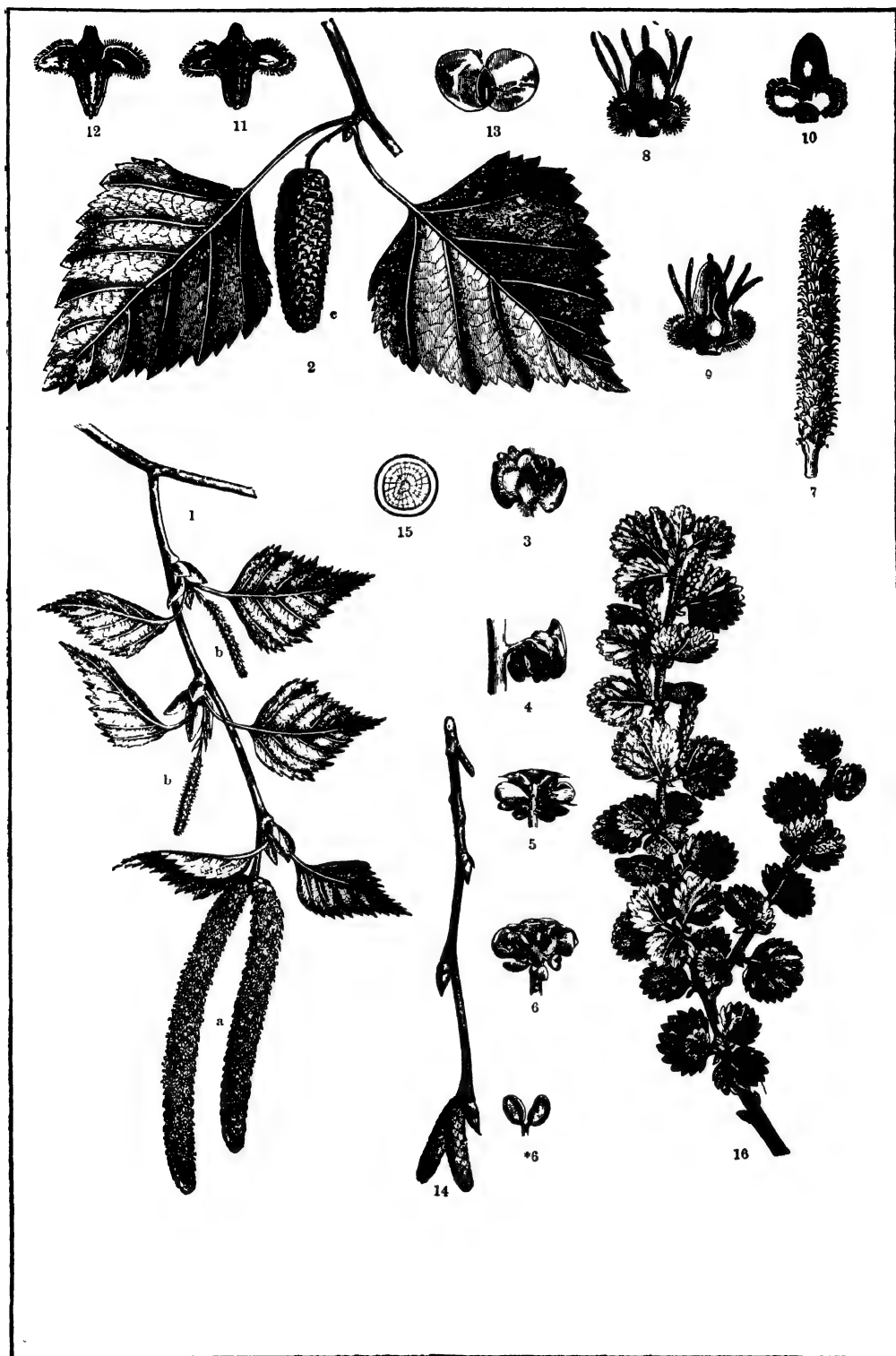
Bird, Frederic Mayer, American Episcopal clergyman, son of R. M. Bird (q.v.): b. Philadelphia, 28 June 1838. He was rector at Spotswood, N. J., 1870-4; chaplain and professor of psychology, Christian evidences, and rhetoric, at Lehigh University, 1881-6; and acting chaplain there, 1893-8. He is noted as a hymnologist, and as the collector of one of the most complete and valuable musical libraries in the United States. He edited several collections of hymns; was associate editor of 'Chandler's Encyclopædia'; editor of 'Lippincott's Magazine' (1893-8); and published 'The Story of Our Christianity' (1893).

Bird, Golding, English medical and scientific writer: b. Downham, Norfolk, 1814; d. 27 Oct. 1854. In 1838 he took the degree of M.D. at St Andrew's, and in 1840 that of M.A. In the latter year he became a licentiate of the Royal College of Physicians, London, and in 1845 was elected a Fellow. In 1843 he was appointed assistant physician at Guy's Hospital, where he also lectured on *materia medica*; and in 1847 he entered on a three years' course of lectures on the same subject at the College of Physicians. He took an active interest in natural history, chemistry, and other subjects more or less connected with medicine; and his multifarious occupations overtaxed his strength and undermined his health, so that he died at a comparative early age. He had by this time acquired a very large practice, and had made his name well known in his profession, more especially by his researches in scientific medicine. A work by which he was more generally known was his 'Elements of Natural Philosophy,' for many years a text-book. A well-known work on 'Urinary Deposits' was also published by him, as also 'Lectures on Electricity and Galvanism in their Physiological and Therapeutical Relations'; 'Lectures on Oxaluria'; etc.

Bird, Isabella. See BISHOP, ISABELLA BIRD.

Bird, John, English mathematical instrument maker: b. in the county of Durham, 1709; d. 31 March 1776. He set up in London about 1745 as a maker of scientific instruments, having previously received instructions from Graham, the greatest mechanician of the time. In 1749 he received an order to construct a new brass mural quadrant of eight feet radius for the Royal Observatory. This was used by Bradley and by Maskelyne, and continued serviceable for 62 years. Duplicates of it were soon ordered for St. Petersburg, Cadiz, and the École Militaire, Paris—the last employed by D'Agelet and Lalande in determining the declinations of 50,000 stars. He also furnished Bradley with a

BIRCH.



1 Spray with a, male and b, female flowers
2 Twig with c, fruit

11-12 Details of fruit c use
13 The fruit

BIRD — BIRD-LIME

new transit instrument and a 40-inch movable quadrant. Bird's marked superiority to all other makers of the day is strikingly exemplified by the fact that in 1767 the Board of Longitude paid him £500 on his agreeing to take an apprenticeship for seven years, instruct other persons as desired, and furnish upon oath descriptions and plates of his methods. A result of this arrangement was the publication of two treatises, named respectively 'The Method of Dividing Astronomical Instruments' (1767), and 'The Method of Constructing Mural Quadrants' (1768), each with a preface by Maskelyne, the astronomer-royal.

Bird, Robert Montgomery, American novelist. b. Newcastle, Del., 1803; d. Philadelphia, 22 Jan. 1854. He qualified as a physician, but soon gave up the practice of medicine for literature. He first became known as a dramatist, having written three tragedies,—'The Gladiator'; 'Oraloosa'; and 'The Broker of Bogota',—the first of these often acted by Edwin Forrest. His first novel was 'Calavar' (1834), his second 'The Infidel' (1835)—both of them having their scene in Mexico, at the time of the Spanish conquest. Then followed the 'Hawks of Hawk Hollow'; 'Sheppard Lee'; and 'Nick of the Woods, or the Jibbenamosay' (1837); the last probably the most popular of all his fictions. Its scene is laid in Kentucky soon after the close of the Revolutionary War, and in it we have a lively picture of pioneer life at this date, and the relentless hostilities between the Indians and the early settlers. He also wrote: 'Peter Pilgrim,' a collection of tales and sketches; and 'Adventures of Robin Day,' a novel.

Bird, Birde, or Byrd, William, English composer: b. 1538; d. London, 4 July 1623. He was trained in music under Thomas Tallis, and was appointed organist of Lincoln about 1563. In 1575 the two composers obtained the monopoly for 21 years of printing and selling music and music paper; and on the death of Tallis in 1585 Bird became sole patentee. His first work of importance was 'Psalms, Sonnets, and Songs of Sadness and Piety, Made into Music of Five Parts' (1588). In 1589 he published a collection of songs, and also a collection of sacred pieces for five voices; a second collection of similar pieces appeared also in 1591. In 1607 he published two books of 'Gradualia,' being a collection of motets for the ecclesiastical year of the Roman Catholic Church; and in 1611 'Psalms, Songs, and Sonnets'. He continued all his life a Roman Catholic, but notwithstanding this held a lease from the Crown of lands confiscated from a Roman Catholic recusant, and never lost the appointment which he held in the Protestant Chapel Royal. Bird was the composer of the first English madrigal. He wrote a large number of pieces for the virginals, and also three masses. He was the author of a celebrated canon, 'Non nobis, Domine,' often sung in England by way of grace after meat at public banquets, and which has never ceased to be popular.

Bird-catching. See TRAPPING.

Bird-catching Spider, a name applied to gigantic spiders of the genera *Mygale* and *Epeira*, which catch birds and suck their blood. The species to which the name was originally given was *Mygale avicularia*, a native of Suri-

nam and other parts of tropical South America. The body of this insect is about two inches long, very hairy, and almost black; when the legs are stretched out it measures about a foot across. It lives in holes or crevices and does not spin a net proper, but makes a tubular nest for itself in which it lurks during the day, seeking its prey by night. Other species of *Mygale* belong to the Malay Archipelago, as *M. javanica* and *M. sumatrensis*. In experiments made with these spiders small birds have been known to die in a few seconds after being bitten. Some of the web-spinning spiders make webs strong enough to entangle small birds, which thus become their prey.

Bird-cherry, in America, the wild, red, pin, or pigeon cherry (*Prunus pensylvanica*) of the natural order *Rosaceæ*, a tree 20 to 40 feet high of little use except occasionally for ornamental purposes, as fuel and as a stock for grafting garden cherries upon. Its red, thin-fleshed fruit is sour and somewhat astringent. The name is also given to European, the haggery of Scotland (*Prunus padus*), whose many varieties are often cultivated for ornament. It sometimes attains a height of 20 feet, bears racemes of flowers larger and a week earlier than the choke-cherry (*Prunus virginiana*), which it somewhat resembles. The fruit, which is black, is smaller than the common cherry and has a disagreeable taste, but is greedily eaten by birds. The wood, which resembles mahogany, and takes a good polish, is used in cabinet-making.

Bird-lice, minute wingless insects parasitic under the feathers of birds and hair of certain mammals, to which they are very annoying. They belong to the sub-order *Mallophaga*, a group of wingless degraded insects allied to the death-tick (*Psocidæ*), stone-flies (*Perlidæ*), and the white ants, altogether constituting the order *Platyptera*. They differ from true lice in having free jaws adapted for biting, and not a sucking beak. The flattened body is corneous, hard above, and the head is horizontal, with three- to five-jointed antennæ; the eyes are small and simple; the mandibles are small, like a hook, and the maxillary palpi, when present, for they are sometimes wanting, are four-jointed, while the labial palpi are two-jointed. The thorax is small and but two-jointed apparently, as the meso- and meta-thorax are united. The abdomen is from nine- to ten-jointed, while the short, thick limbs have two-jointed tarsi and one or two claws.

Bird-lime, a viscous substance used for entangling small birds so as to make them easily caught, twigs being for this purpose smeared with it at places where the birds resort or to which they are attracted by a call-bird. It is often prepared from the middle bark of the holly, which is stripped off in June or July, boiled in water for six or eight hours, and the water being strained off, is then left to ferment. This process may take two or three weeks, during which it is watered if necessary. At the end of this time it assumes a mucilaginous form, and after being pounded in a mortar and worked with the hands in water, is fit for use. This substance, when prepared, is of a greenish color and very tenacious. Mice are sometimes caught with it as well as birds.

BIRD-TICK — BIRDS

Bird-tick, one of the horse-tick or forest-fly family (*Hippoboscidae*) of the order *Diptera*. Like the horse-tick the body is much flattened; unlike the *Hippobosca*, or horse-tick, it has ocelli, but in the short proboscis it resembles the latter fly. In the wings there are six costal veins. There are numerous species, all of which are bird-parasites. *Olfersia americana* lives on the owl and other birds. Certain species of *Lipoptera* live on birds, but afterward migrate to mammals, finally losing their wings through disuse.

Bird of Paradise Flower. See STRELITZIA.

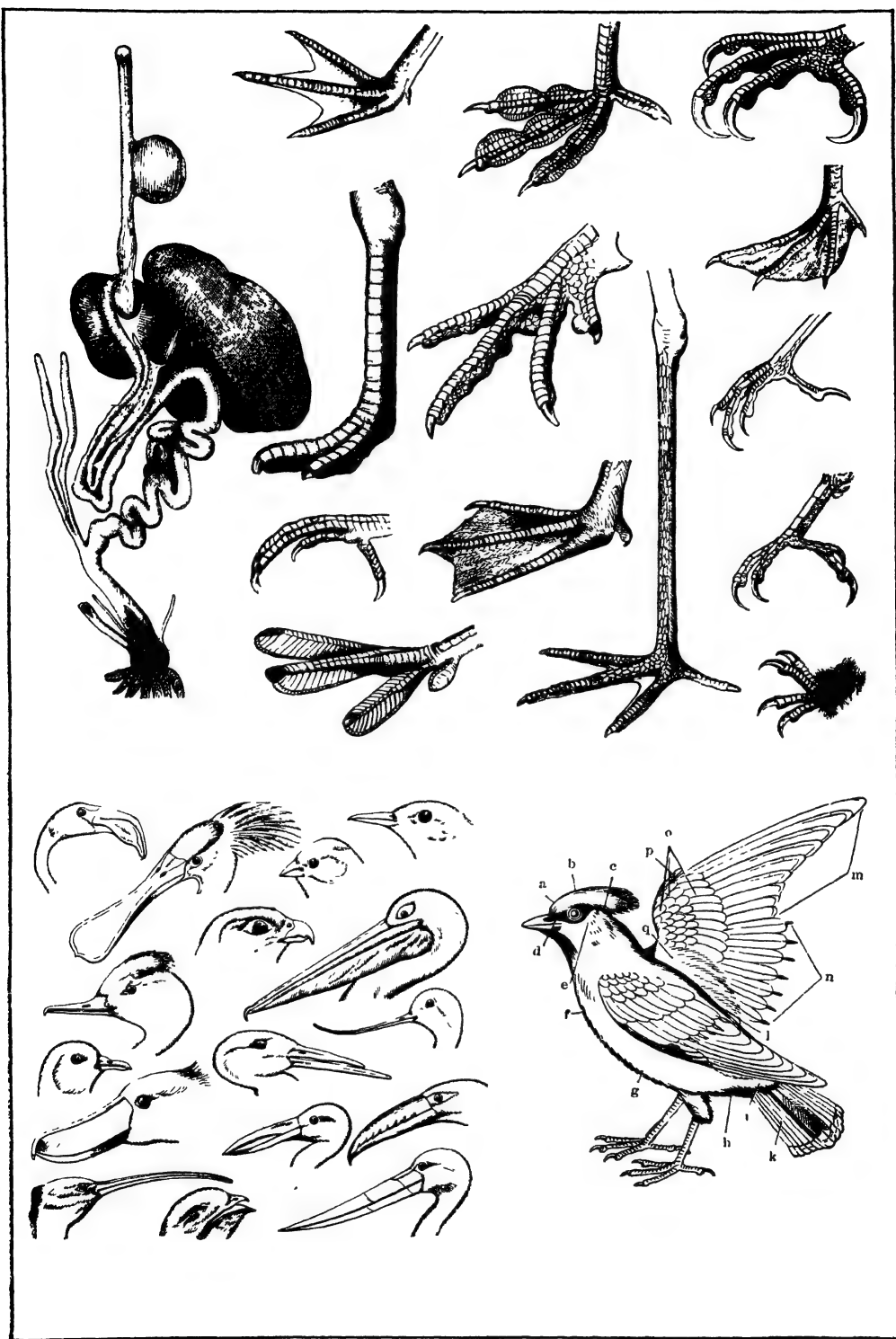
Birds. The birds form that class (*Aves*) of warm-blooded vertebrate animals most distinctive, most easily defined, and most popularly known and interesting. They are at once distinguished by their covering of feathers, which is possessed by no other sort of animal; and by the modification of their fore-limbs into instruments for flight (wings). Their aerial existence, from which few have wholly departed, requiring great activity and exertion, has called forth a high perfection of organization, especially in the respiratory and circulatory systems of the body, and has led to the characteristic spindle-shaped form, narrowing from the full chest and shoulders toward a pointed head, which will cleave the air easily, and diminishing toward the rudder-like tail. The graceful form, to which the beauty of birds is largely due, has been brought about by the enlargement of the shoulder-girdle, and its great pectoral muscles, and by the necessity of an increased capacity of chest to contain the comparatively great heart and lungs. In birds such as ostriches, cassowaries, moas, and the like, which have ceased to fly, and have developed very strong legs; or in those like the penguins, which have become swimmers and divers, the changes of structure are degenerations from the type, which is a bird with powers of flight.

Flight, as well as clothing, is due to the presence of the complicated horny appendages growing from the skin, called feathers, which are peculiar to the class. Their structure is described under FEATHERS. Those of the body are usually small, grow in certain definite tracts (see PTERYLOGRAPHY), varying in the different groups, and form a close jacket, not easily pervious to moisture and a poor conductor of heat, thus conserving the vital warmth and protecting the body against sudden changes of temperature. It is shed (molted) and renewed semi-annually. This body-coat is ordinarily nearly uniform in length and character, but often is varied by ornamental plumes, erectile crests, ruffs, and other modifications, such as are seen in birds of paradise, herons, and many others. The feathers are also variously colored in patterns varying with the groups and more minutely with the species, whereby they may recognize each other and be distinguished by us. These colors are usually those of pigments incorporated in the web of the feather itself, but may be due to minute scales on the surface, which break up the light, giving it an iridescent or metallic sheen, conspicuous in humming birds and certain pheasants. The plumage often varies, according to age, sex, season, or all three conditions; and these colors play an important part in bird-life (see COLORA-

TION PROTECTIVE: NATURAL SELECTION). The bones of the wing and tail support very large, strong "quill" feathers, which, when outspread, support the bird in the air, and when moved in the proper manner carry it forward—enable it to fly, the mechanism and phenomena of which method of locomotion are explained under FLIGHT. The wing power of most birds is very great, but the speed of their flight is often exaggerated. Few exact facts are at hand, but it is apparent that the highest speed is nearer 50 than 100 miles an hour, although the latter figure is often stated. Endurance on the wing is more remarkable. Many sea-birds seem tireless, and swallows, among land birds, are almost incessantly in the air. During migrations a large variety of birds, including some of the smallest and feeblest, undertake rapid and extensive journeys, reaching in some cases almost half around the world; and some regularly pass over spaces of ocean as much as 2,000 miles in width, while a flight of 500 miles from land to land is accomplished by many species. This is the more notable as a feat because in many cases they are birds which during nine tenths of the year only flit from bush to bush. In these migratory journeys (see MIGRATION) birds often fly very high; but this is the regular custom of certain ones, especially vultures, which soar beyond human sight, yet will swoop to the earth in a swift dash, betraying great adaptability to sudden changes in atmospheric density. Other notable qualities are the power (largely residing in the tail) to suddenly change speed and direction, helping them to dodge and elude winged pursuers, and to catch the agile aerial insects, upon which many of the smaller species depend for subsistence. The sharpness and quick adjustability of eyesight also involved in this is noteworthy.

These abilities in flight have led to the very wide distribution of birds, which occur in every part of the world yet seen by man; and are the most numerously represented of all terrestrial branches of animal life in the oceanic islands. Nevertheless very few are cosmopolitan, and not many range beyond the confines of a single continent, while many are more narrowly restricted, so far at least as their habitat in the breeding season is concerned. Thus the geographical distribution of birds has been found perhaps the best criterion for the mapping out of zoogeographical regions (see ZOOGEOGRAPHY). The greater number of families of birds is tropical, and both variety of kinds and numbers of individuals decrease toward the poles. A striking fact is the great difference between the birds of the northern and the southern hemispheres—a difference much more decided than exists between Europe and North America, or South America and Australasia.

Birds in every case reproduce their kind by means of eggs protected by a calcareous, often highly-colored shell, laid by the mother a considerable time before they are ready to hatch, which consummation is brought about by the application of warmth. This may be arranged for in two ways. A few birds bury their eggs in rotting vegetation, or in hot sand, and let the chemical heat evolved by the ferment in the former case, or the sun's rays in the latter, accomplish the desired result. The great majority, however, place their eggs in some sort of a receptacle (sometimes a mere hollow on



1 DIGESTIVE ORGANS

2 FORMS OF FEET — a, partially webbed, b, lobe-foot, c, insessorial foot, d, runner's foot, e, walker's foot, f, palmated foot, g, gressorial foot, h, web foot, i, cloven foot, j, scansorial or yoke foot, k, cloven web foot, l, scissor-bill, m, arassari, n, ibis, o, song-bird, p, stork

g, avocet, h, saw-bill, i, scissor-bill, j, dove, k, shee-bill, l, gap bill, m, arassari, n, ibis, o, song-bird, p, stork

4 FEATHERS OF A BIRD — a, frontal, b, crown; c, ...

BIRDS

the ground, or hole or niche in a cliff or tree, sometimes in a burrow or nest of more or less elaborate construction (see NESTS), and there brood upon, or "incubate" them until the chick matures and emerges. In one class of birds (*Præcoces*) incubation is so long continued, and the embryonic chick becomes so far advanced before leaving the shell, that it is well coated with feathers, and can at once begin to take care of itself. These birds are the sea-birds, water-birds, game-birds, and their allies of comparatively low organization. In another class (*Altrices*) of higher organization as a group, the chicks are permitted to break from the shell before they have acquired feathers or are able to move about or obtain food. They must therefore be shielded, defended, fed, and cared for by the parents for several days or weeks. Out of this condition have grown some of the most interesting, complicated, and delightful features, habits, and instincts of bird-life.

Birds as a class are omnivorous, but each of the various groups might be characterized by its food, which, more than anything else in the process of evolution, has determined the various types of structure, which distinguish the tribes, and which are indexed, as it were, by the form of the bill and feet. Those of lowest organization,—nearest the ancestral type,—are the sea-birds, which live upon fish varied to some extent by mussels and other small marine creatures. Many of the ducks and shore-birds share this marine diet, and numerous wading birds eat fresh-water fish, frogs, crayfish, and the like. The great body of ratite and gallinaceous birds,—ostriches, emeus, partridges, pheasants, etc., that run and nest on the ground,—are vegetable-eaters, seeking green leaves, fruits, seeds, lichens, etc., and picking up such insects as come in their way. All the foregoing are præcocial birds, and the young feed on the same things as their parents. These classes have little relation to mankind so far as their food is concerned except that they sometimes devour too much grain or spoil certain plants. Among the higher class, or altricial birds, the fare is more varied, and while there is a very numerous group (the cone-billed or fringilline birds; see FINCH; SPARROW, etc.), which live altogether upon seeds, and a few others, like the kingfishers, which catch fish, the great majority indulge themselves in a miscellaneous diet of both vegetable and animal materials. Some, called "soft-billed," and including most of our song-birds, except the finches, are mainly insect eaters, some catching them upon the wing, others digging them out of rotten wood, and the greater number picking them off the leaves of trees or searching for them among the herbage. Another large class, embracing the birds of prey, and a few others, like the shrikes, depend for food upon capturing and devouring other smaller birds, together with such small mammals, reptiles, amphibians, fish, and insects as they are able to seize and kill. These are the falcons, owls, and their relatives; but a related group varies this fare by feeding upon carrion. In the case of all of these altricial birds, however, except the birds of prey, the young are fed upon soft insect food, mainly worms, caterpillars and maggots; and the period of their nesting coincides with the time when these larval insects abound. In the feeding habits of these

higher birds man has a great interest, for nearly all of the innumerable insects which they capture for themselves, or for the nourishment of their young, are such as are annoying or injurious to him, and experience in many localities has shown that the destruction of bird-life is accompanied by a distressing increase of noxious insects. In the same way the hawks and owls, by their incessant pursuit of mice, and other small animals injurious to agriculture, so reduce the numbers of these pests, as greatly to benefit the farmer; while the useful work done by the vultures, as scavengers, by removing offal and dead animals, is recognized by everyone in the tropical regions where these birds most abound.

Nor does the relative usefulness of birds to man stop here. They not only afford him great pleasure, by their pleasing colors and animated behavior, and delight his ear by their voices, but large numbers of them furnish him with excellent and even dainty food. Lastly, this group has furnished men with several varieties of domestic poultry, such as the turkey, peacock, guinea-fowl, duck, goose, and various pigeons and chickens, which are among the most valuable of his animal possessions.

Birds are extremely rare as fossils, compared with other vertebrates, and little is known about their evolution. Four or five hundred extinct species have been described, as against 12,000 living, and most of them are from very fragmentary remains. The reasons for their scarcity is partly their small size and the slight construction of their skeletons, which makes their bones less likely to be buried in sediments and preserved as fossils. At a few localities, however, as in the Oligocene strata of the department of Allier in France, and the Pleistocene deposits of Fossil Lake in Oregon, they occur abundantly. Birds have been found as far back in geological time as the Jurassic Period of the Age of Reptiles. The supposed bird-tracks of the more ancient Triassic sandstones of the Connecticut valley are now believed to be mostly, if not all, tracks of Dinosaurs (q.v.), a group of reptiles having many bird-like characters. From some ancient offshoot of this group the birds are probably descended, but the early stages of their evolution are not known. Jurassic birds (see ARCHÆOPTERYX) had teeth instead of a horny beak, a long reptilian tail and other primitive characters. In the succeeding Cretaceous Period the tail has become short and rudimentary, with its feathers springing from a small bony plate at its tip as in modern birds, but some genera (*Ichthyornis*, etc.) retain the teeth. In all later birds the teeth are replaced by a horny beak. They appear to have changed comparatively little during the Tertiary and Quaternary Periods, in marked contrast to the great evolution of the mammals during the same time, and most Tertiary birds are closely related to, or included in modern genera. There are a few remarkable extinct forms known, among which are the gigantic ground-birds of New Zealand, Madagascar, and elsewhere, more or less nearly related to the modern ostriches and the *Phororhachos* of South America.

References to books upon birds will be found under the title ORNITHOLOGY, where also the structure, and classification of birds are considered.

ERNEST INGERSOLL,
Editorial Staff 'Encyclopedia Americana.'

BIRDS — BIRDS OF PARADISE

Birds, The, a comedy by the Greek dramatist Aristophanes, that appeared in 414 B.C. It belongs with the writer's earlier plays, in which farcical situations, exuberant imagination, and a linguistic revel, are to be noted. The comedy is a burlesque on the national mythology; the author creates a cloudland for his fancy to sport in without restraint.

Birds of America, The, the monumental work of John James Audubon, the great American naturalist, first published in England between the years 1827 and 1830. It contained colored illustrations of 1,065 species of birds. The text is descriptive of the habits and manners of the birds observed by Audubon himself in his long wanderings over the North American continent.

Bird's-eye Limestone, the old name of a rock of the Trenton formation, now called Lowville Limestone. It is a fine-grained, dove-colored stone, in which the crystallized corals of the genus *Tetradium* appear as whitish points.

Bird's-foot, (*Ornithopus*), a genus of about seven species of small slender pinnate-leaved, white, pink, or yellow flowered annual herbs of the natural order *Leguminosæ*. The common and generic names were suggested by the shape of the articulated, cylindrical pods which resemble the bent claws of a bird. The principal species, *O. sativus*, is used as a forage plant.

Birds' Nests. See NESTS.

Birds' Nests, Edible, the nests of the salangane (*Collocalia fuciphaga*) and other species of swifts or swiftlets, found in the Malay Archipelago, and used as an article of luxury among the Chinese. They are particularly abundant in Sumatra and Borneo, especially near the north end of the island. The nest has the shape of a common swallow's nest, is about the size of a half teacup, is found in caves, particularly in sea-cliffs, and has the appearance of fibrous gelatine or isinglass. They appear to be composed of a mucilaginous substance secreted by special glands, and are not, as was formerly thought, made from a glutinous marine fucus or seaweed. The finest nests at present are said to bring as high a price as \$12 or \$13 a pound. Seventy-five or one hundred dollars' worth are said to be sent to Singapore and China annually. They are bought almost exclusively by the rich Chinese, who consider them a great stimulant and tonic, and are used in making soup. The finest are those obtained before the nest has been contaminated by the young birds; they are pure white, and are comparatively scarce. The inferior ones are dark, streaked with blood, or mixed with feathers; they are chiefly converted into glue. Some of the caverns in which these nests are built are difficult of access and dangerous to climb, so that none can collect the nests but persons brought up to the trade. The following account of the traffic in these birds' nests is extracted from Crawford's excellent work on the Eastern Archipelago: "The best nests are those obtained in deep, damp caves, and such as are taken before the birds have laid their eggs . . . They are taken twice a year, and if regularly collected, and no unusual injury be offered to the caverns, will produce very equally, the quantity being very little, if at all, improved by

the caves being left altogether unmolested for a year or two. Some of the caverns are extremely difficult of access, and the nests can only be collected by persons accustomed from their youth to the office. The most remarkable and productive caves in Java, of which I superintended a moiety of the collection for several years, are those of Karang-bolang, in the province of Baglen, on the southern coast of the island. Here the caves are only to be approached by a perpendicular descent of many hundred feet by ladders of bamboo and rattan over a sea rolling violently against the rocks. When the mouth of the cavern is attained, the perilous office of taking the nests must often be performed with torchlight, by penetrating into recesses of the rock, where the slightest trip would be instantly fatal to the adventurers, who see nothing below them but the turbulent surf making its way into the chasms of the rock. The only preparation which the birds' nests undergo is that of simple drying, without direct exposure to the sun, after which they are packed in small boxes, usually of half a picul . . . They are consumed only by the great; and indeed the best part is sent to the capital for the consumption of the court. The sensual Chinese use them under the imagination that they are powerfully stimulating and tonic; but it is probable that their most valuable quality is their being perfectly harmless. The people of Japan, who so much resemble the Chinese in many of their habits, have no taste for the edible nests; and how the latter acquired a taste for this foreign commodity is no less singular than their persevering in it."

Birds of Passage, any migratory birds. See MIGRATION.

Birds of Paradise, a family of birds of New Guinea, northern Australia, and the neighboring islands, which contains a large number of species, notable for splendid plumage, although they are most nearly allied to the plainly dressed crows. The name "bird of paradise" is a translation of the native name in the Island of Batchian, "manukdwata," meaning birds of the gods. About 50 species of these birds are known, varying in size from that of a crow to that of a sparrow; all are forest birds, spending their lives in the tree-tops, where many of them go about in small flocks, active and noisy, but are inclined to hide themselves in the thickest foliage, as though aware that their plumage rendered them easily conspicuous to their enemies. None are singers, and in most cases the voice is a loud, harsh cry, or a sharp whistle, or in some species, strange mewing notes. It is related that on some of the islands certain species were called "birds of the sun," because of their habit of joining in loud choruses at sunrise. Their diet consists mainly of fruit, and especially of berries and seeds; the fig and the nutmeg are especially eaten, and some species suck honey from the large tropical flowers. Insects are captured by all species, as also are the numerous snails inhabiting the trees and bushes of that region, and the larger forms devour frogs and lizards. In pursuit of insects, worms, and snails, several species spend much of their time scrambling about the trunks of trees, and searching the bark, like creepers. The breeding habits of these birds vary extensively, and the nests and eggs of many have not

BIRDS OF PARADISE

yet been discovered. The typical paradise-birds construct rather loose, careless platforms of sticks and leaves, moss, etc., placed in trees or bushes, and lay eggs which are much streaked and spotted, and vary in color and patterns. The very extraordinary nests and play-grounds of that section of the family which is terrestrial, and inhabits Australia, are described under bower-birds (q.v.).

Interest in the birds of paradise centres in their marvelous displays of plumage. These are exhibited in most species by the male alone, the female being comparatively plain and simple in her attire, as also are the young of both sexes, until the young males arrive at maturity. This dissimilarity between the females and males of birds in which the latter are highly adorned, is a protective arrangement, designed to keep the females from observation while they are sitting defenseless upon their nests, where they would easily be discovered, and often killed, did they wear the conspicuous colors and ornaments of their brilliant mates. Natural selection, by keeping their colors, and those of the inexperienced and comparatively helpless young ones plain, has tended to preserve the species; and at the time when the females are brooding their mates remain at a discreet distance from the nests, so as not to betray their position to the monkeys, lemurs, civets, serpents, and other searchers for eggs and fledglings. The same influence, acting through sexual selection (q.v.), has developed in the males the bright colors and eccentric adornments which distinguish this group of birds as a means of increasing their attractiveness in the eyes of the females. The theory is that the most beautiful male will be chosen first as a mate, and will transmit to its offspring its tendency toward ornamentation or high color, and that thus, by constant rivalry between the males, the excessive ornamentation in this group has slowly arisen. A justification for this view is found in the fact that in the courting season, which occurs at the opening of the rainy season, numbers of males of each species gather in certain spots, sometimes on the ground, but more usually on the limbs of the forest trees, and go through a great variety of movements and strange antics, lifting their wings, spreading their tails, erecting their crests, and apparently doing everything in their power to display their finery in the eyes of the females, and thus solicit them to make a choice. Natives call these assemblages, which usually occur at sunrise, and always in the same place, "dancing parties," and it is during this time that they secure specimens for the trade, by shooting them from ambush with blunt arrows. So persistent has been the demand for their skins and feathers, chiefly for millinery purposes, that many of the species have been nearly exterminated. This may easily occur from the fact that the range of most of the birds of paradise is very limited, several species being confined to a single island. Their increase, too, is slow, as most of them lay only two or three eggs, a condition which has arisen from the fact that their natural enemies are comparatively few. They have occasionally been captured alive, and kept for a time in captivity, even in the zoological gardens of Europe, but they do not thrive in confinement. The best-known of the birds of paradise, is the great emerald paradise bird (*Paradeisea apoda*) of the Moluccas which was brought to Europe

first in 1523, by the members of Magellan's company, on their return from the first circumnavigation of the world. They brought two dead specimens which had been given to them in the island of Batchian as a mark of royal favor. From these skins the natives, as was their custom, had cut off both the wings, and the feet; and this gave rise to the absurd stories of the early books, that the paradise birds were naturally footless and wingless, never perched, suspended themselves by the tail-feathers, etc. It was also said that they gazed perpetually at the sun, and that the hen laid her eggs on the back of her spouse. This species is as large as a crow. The male is rich brown, becoming purplish beneath, the head and neck are pale yellow, the forehead, cheeks, and throat, metallic green. From the sides of the body, beneath the wings, spring thick tufts of delicate, loosely-webbed, golden-orange feathers, which, when the wings are lifted, may be lifted and spread out so as to seem to fall like a shower over the whole bird; and the two middle tail-feathers are like long wires, each with a very slight flag-like web at the tip. It would be impossible to describe at length the great variety and splendor of the plumage of these eccentrically ornate birds, only a few of which may be further alluded to. In the red bird of paradise (*Paradeisea sanguinea*) the plumage is like velvet in a variety of gorgeous colors, and the tufts at the sides are rich crimson, while the elegantly curling central tail-shafts are 21 inches in length. A genus of New Guinea (*Cincinnurus*) includes a number of species, only about six inches long, called the king birds of paradise, which are distinguished by large tufts of fan-like plumes on each side of the breast. Another genus (*Parotia*) has as its especial ornament a group of three long feathers springing from behind each eye, which are in the form of metallic wires, with a racket-like web at the end that may be erected and moved about as the bird wishes. Otherwise the plumage is black, except for some vivid steel-green and white feathers about the head. Some species have a distinct shield of metallic, scale-like feathers, upon the back or upon the breast, which may be glossy blue, or green, or violet, or glowing scarlet, or a mixture of these. The acme of this strange and gorgeous development in plumage seems to be attained by the "superb" bird of paradise (*Lophorhina superba*), which is characterized by the presence of an enormous erectile forked shield of velvety black feathers arising from the nape of the neck, and when in repose lying flatly on the back. So strange and apparently incongruous is this shield, that it might suggest to the beholder that the tail of some other bird had been stuck on to the skin, were it not that its feathers are of a different type. The ground-color of the plumage is of the deepest black, but with bronze reflections on the neck; while the feathers of the head are metallic green and blue. Spreading over the breast is a shield composed of narrow and rather stiff feathers, which extends in a pointed form, along each side, and is emarginate in the middle. In color, this is bluish-green, with a satiny sheen; the back shield, on the other hand, is velvety black, with reflections of bronze and purple, its outermost feathers exceeding the primaries of the wing in length. The natives say that the enormous crest, when displayed during the courtship

BIRDS OF PREY — BIRETTA

of the female, is not only raised, but spread widely out, in a fan-like manner, while the chest shield is similarly expanded. Hence the head of the bird forms a circle of irregular feathers of velvety black and emerald, completely concealing the rest of the body when viewed from the front.

General information as to the birds of paradise will be found in books of East Indian travel, especially in 'The Malay Archipelago' (1869), by Alfred Russel Wallace, the first naturalist to study these birds attentively in their native haunts. As early as 1873, Daniel Elliot completed a magnificent monograph of the family, illustrated with colored folio plates, and in 1881 was published a second monograph, by Salvadori, as a part of his general work on the ornithology of the Papuan region. Still more recently German naturalists have increased our knowledge of this family by many papers in German scientific periodicals, which have been utilized by Rothschild in the preparation of his account of these birds in 'Das Tier-reich' (Berlin 1898). The most recent sketches are those of the 'Royal Natural History' (Lond. 1895), and Evans, 'Birds' (Lond. 1900).

Birds of Prey. This group is a survival of the old-fashioned classification of animals by resemblances in appearance and function, rather than in structure. Broadly speaking, a bird of prey is merely one which subsists by attacking and devouring living creatures, and hence the name covers such birds as skuas, frigate-birds, shrikes, and fish-catching birds, as well as the eagles, hawks, and owls, to which it is restricted by popular usage. In all these cases the adaptations are for a predatory life, especially marked in the strong seizing talons of the hawks and owls, and in their hooked, sharp-edged beaks, suitable for tearing and cutting, along with which go suitable modifications of the digestive organs, characteristic of the accipiters. These adaptations bear a curious, yet natural likeness to the claws, teeth, etc., of carnivorous mammals and reptiles.

Birdsall, William W., American educator. b. Richmond, Ind., 1854. He was graduated from Earlham College, Indiana, 1873 and was a successful teacher in and head of large secondary schools until 1898. He was president of Swarthmore College, Pennsylvania, 1898-1902.

Birdwood, Herbert Mills, English lawyer: b. Belgaum, Bombay Presidency, 29 May 1837. He was educated at Edinburgh University, and was dean of arts (1868, 1881, 1888, 1890) and syndic at the Bombay University, and vice-chancellor 1891-2. He entered the Bombay civil service 1858; was made assistant collector and magistrate 1859; assistant judge 1862; under secretary to the government, judicial, political, and educational departments, and secretary of the legislative council 1863; acting registrar of the high court, Bombay 1867; district judge for Ratnagiri, Surat, and Thana 1871-80; judicial commissioner and judge of the sadar court, Sind 1881; three times acting judge of the high court, Bombay 1881-5; puisne judge of the high court of Bombay 1885-92; and member of the executive council of the governor of Bombay 1892-7. His publications include 'Catalogue of the Flora of Matheran and Mahableshwar'; 'Catalogue of Bills Introduced

into the Bombay Legislative Council in 1862-5'; and papers relating to the constitution of the council, the plague in Bombay, etc.

Bireme, a Roman ship of war with two banks of oars. It was inferior, in magnitude and strength, to the trireme.

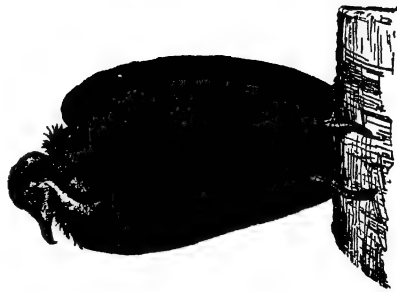
Biren, bē-rōn, or **Biron**, **Ernest John von** (DUKE OF COURLAND), Russian statesman (grandson of a groom of James, Duke of Courland, and the son of a Courland proprietor of the name of Bühren): b. 1687, d. 28 Dec 1772. He studied at Königsberg, secured the favor of Anna, Duchess of Courland, and niece of Peter the Great of Russia; but he was unsuccessful in his attempt to obtain admission among the Courland nobility. When, in 1730, Anna ascended the Russian throne Biren was loaded by her with honors and introduced at the Russian court. Here he assumed the name and arms of the Dukes of Biron in France. Fierce and haughty by nature, he indulged his hatred against the rivals of his ambition. The Princes Dolgorucky were his first victims. He caused 11,000 persons to be put to death, and double that number to be exiled. It is said that the empress often threw herself at his feet to induce him to lay aside his severity, but that neither her entreaties nor her tears were able to move him. The firmness of his character, however, introduced vigor and activity into all branches of the administration throughout the empire. In 1737 Anna forced the Courlanders to choose her favorite (who had in 1722 married a Courland lady) for their Duke. After declaring Prince Ivan her successor, she appointed Biren regent. Anna died 28 Oct 1740. The new regent acted with prudence and moderation. But a secret conspiracy was soon formed against him. Field Marshal Munnich caused him to be arrested in his bed during the night of 19 Nov. 1740, and to be confined in the castle of Schlüsselburg. He was subjected to a trial; but the sentence of death was changed into that of imprisonment for life, and his fortune was declared confiscated. Together with his family he was transported to Pelym, in Siberia, and thrown into a prison, of which Munnich himself had furnished the plan. In the following year Elizabeth, daughter of Peter the Great, being raised to the Russian throne by a new revolution, Biren was recalled 20 Dec. 1741, and Munnich was obliged to occupy his prison. At Kasan the sledges met; the travelers recognized each other, and proceeded on their way without interchanging a word. Biren was detained at Jaroslav, and only received his full liberty in 1762 from Peter III. When Catherine II ascended the throne the Duchy of Courland was restored to Biren in 1763. He governed with wisdom and lenity, transferring the government to his eldest son, Peter.

Biretta, a cap worn by ecclesiastics, especially those of the Roman Church, though some ritualistic clergymen of the Anglican Church also wear it. It is of considerable antiquity, though it has varied in shape and material at different times. It is at present a stiff-sided, square-shaped cap with sharp edges, a flattened top surmounted by ridges rising above it, having in the centre a sort of tuft or tassel. It is made of cloth or stuff, the color being black for priests, purple or violet for bishops, and scarlet for cardinals. See VESTMENTS.

BIRDS OF PREY



1.



4.



3.



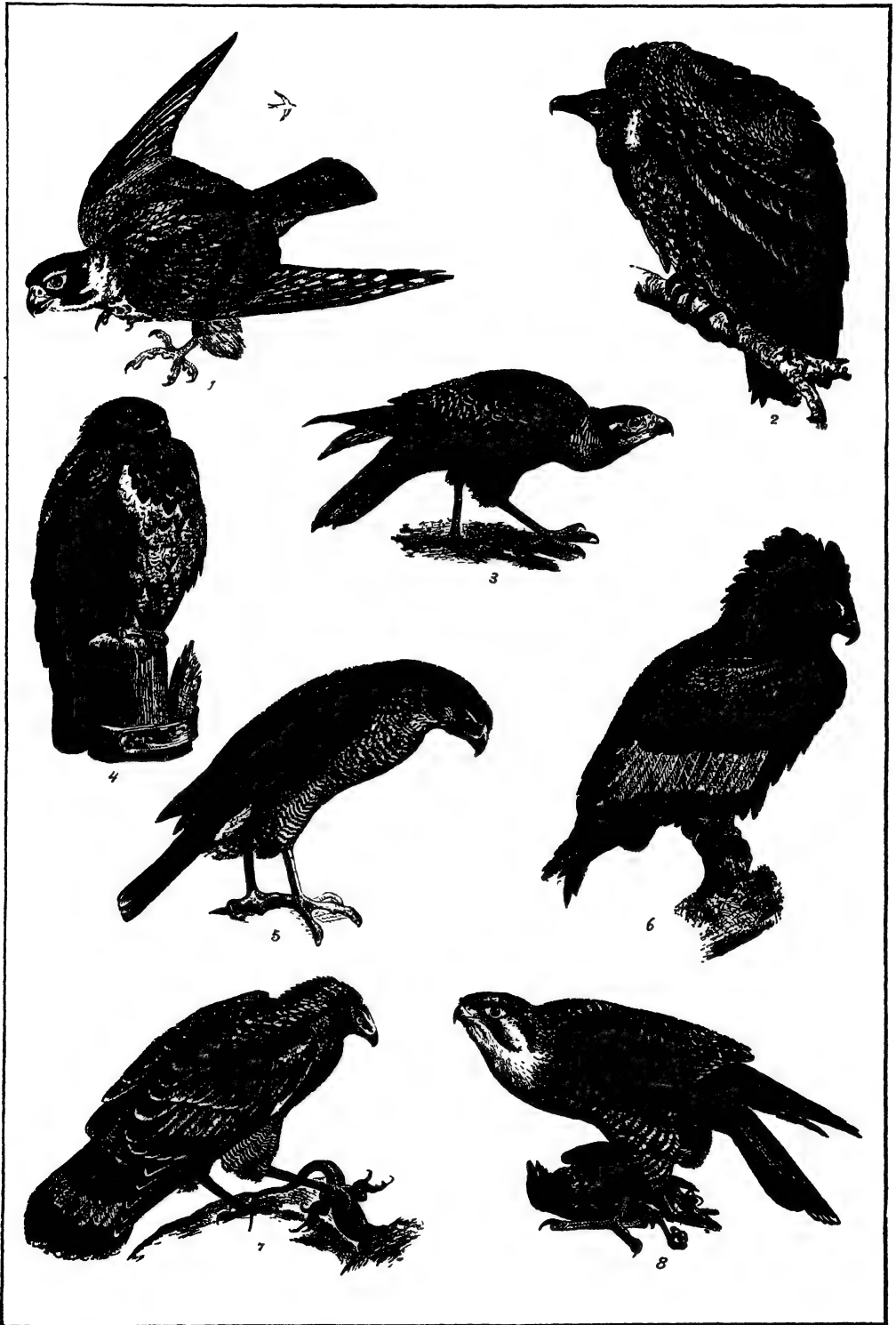
2.



5.

- 1 The Carrion Crow (*Catharista atrata*)
- 2 The King Vulture (*Sarcornamphus papa*)
- 3 The Turkey Buzzard (*Catharista aura*)
- 4 The Pileated Vulture (*Neophron pileatus*).

BIRDS OF PREY



1. Hobby (*Falco subbuten*)
2. Ruppell's African Vulture (*Gyps Ruppelli*)
3. Carancho (*Polyborus Brasiliensis*)

5. Sparrow Hawk (*Accipiter Nisus*)
6. Bataleur Eagle (*Helotarsus ecaudatus*)
7. South American Buzzard-Hawk (*Accipiter polyborus*)

8

BIRGE — BIRMINGHAM

Birge, Edward Asahel, American naturalist: b. Troy, N. Y., 7 Sept. 1851. He graduated at Williams College 1873; studied physiology and histology at Leipsic 1880-1; became instructor of natural history in the University of Wisconsin 1875; professor of zoology 1879; dean of the College of Letters and Science in 1891; and acting president of the university 1900-1. In 1894 he became director of the Geological and Natural History Survey of Wisconsin. He has written many articles and papers on zoology.

Birge, Henry Warner, American soldier: b. Hartford, Conn., 25 Aug. 1825; d. New York, 1 June 1888. At the outbreak of the Civil War he organized the 4th regiment Connecticut Volunteers, and was commissioned its major 23 May 1861. In November 1861 his uncle, Gov. Buckingham of Connecticut, appointed him colonel of the 13th Connecticut Volunteers, which joined Butler's army at New Orleans. He took part in the siege of Vicksburg and the first Red River campaign; commanded a division in Grant's Virginia campaign; and was with Sheridan in the latter's most brilliant movements in the Shenandoah valley. In November 1865 he resigned with the rank of brevet major-general. His services were recognized by an appreciative vote of thanks from the legislature of Connecticut.

Birkbeck, George, originator of mechanics' institutes: b. Settle, Yorkshire, 10 Jan. 1776; d. 1 Dec. 1841. He studied medicine at Edinburgh and took the degree of M.D. in 1799, among his friends and fellow students being Brougham and Jeffrey. Being appointed to the chair of natural and experimental philosophy in the Andersonian University at Glasgow, in 1799, he delivered his first course of lectures. The following year he began to give gratuitous lectures to mechanics, which were soon largely attended. This was the first attempt to establish mechanics' institutes, and to Dr. Birkbeck the honor of being their founder belongs. The Glasgow Mechanics' Institution, though not established till 1823, owed its origin to these lectures delivered by him. In 1804 he settled as a physician in London, and was soon engaged in an extensive practice, but the extension of scientific knowledge to mechanics was ever in his thoughts, and in 1824 he had the happiness of being elected president of the London Mechanics' Institution, for which that at Glasgow had led the way. Similar institutions soon arose and prospered in all the larger towns of the kingdom. Dr. Birkbeck was also connected with the founding of University College, London, advocated the repeal of the tax on newspapers, and was active as a lecturer and promoter of various educational movements. The London Mechanics' Institution still exists, but it is now known as the Birkbeck Literary and Scientific Institution.

Birkenhead, England, a parliamentary, county, and municipal borough of Cheshire, on the estuary of the Mersey, opposite Liverpool. Its growth has been rapid. It owes its prosperity to the same causes that have made Liverpool a great seaport, and may be regarded as a suburb of that city. Its docks have a lineal quay space of over nine miles, with a complete system of railway communication for the shipment of goods and direct coaling of steamers. It has a handsome square, a town-hall; sessions

court and police courts; market; modern slaughter-houses; public baths; and ranges of dwelling-houses for workmen, unusually complete in their accommodation and in all their appointments. The system of drainage and sewerage is very complete. There is a theological college of the Church of England (St. Aidan's); a free public library, schools of art, etc. The ruins of an ancient Benedictine priory founded in 1153 still exist in a good state of preservation. The ferry privileges were formerly vested in the monks of this priory. The benevolent institutions comprise an infirmary, children's and lying-in hospitals, and a dispensary. It has a large public park of 114 acres beautifully laid out, and another and smaller public park. Its magnificent docks and dock warehouses, however, which belong to the splendid Liverpool system, form the distinguishing feature of Birkenhead. The Mersey tunnel, $4\frac{1}{2}$ miles long, including the approaches, 21 feet high, and 26 feet wide, and which cost \$6,100,000, now connects Liverpool with Birkenhead. Communication with Liverpool is also kept up by steam ferries, the property of the corporation, which yield a handsome revenue. The corporation also owns the gas, water, and electric lighting plants, and the tramway lines, which were introduced here by George Francis Train, one of the earliest systems in Great Britain. The water-supply, which is abundant and of excellent quality, is obtained within the borough by pumping from the red sandstone strata which underlies it. Birkenhead has gained a distinguished name for ship-building, the extensive yards of Laird Bros. (builders of the famous Confederate ship Alabama) being located here. There are machine and engineering works, wagon factories, flour-mills, oil-cake mills, etc. Birkenhead has returned a member to Parliament since 1861. It received a charter of incorporation as a municipal borough in 1877. Pop. (1821) 236; (1901) 110,926.

Bir'ket-el-Keroon' ("lake of the horn"), Egypt, a lake in the Fayoom, about 30 miles long and 6 miles wide. It communicates with the Nile and had connection formerly with the artificial Lake Mœris, with which it has been confounded.

Birkett, Herbert Stanley, Canadian physician: b. Hamilton, Ont., 17 July 1864. He graduated at McGill University in 1886, was senior house surgeon to the Montreal General Hospital 1886-7; and assistant physician to the Montreal Dispensary 1887-9. He is a Fellow of the American Laryngologist Association. In 1889 he was appointed demonstrator of anatomy at McGill University, and in 1900 was laryngologist to the Montreal General Hospital, and aurist to the Mackay Institute for Deaf Mutes.

Birmingham, Ala., "the Pittsburg of the South," the industrial head of the entire South between Atlanta and New Orleans, and the chief centre of the iron and coal industry south of Pennsylvania; county-seat of Jefferson County, in the northern centre, midway between the Coosa and Black Warrior rivers, 608 feet above the sea in a valley, near where the last Appalachian spurs sink to the coast plain; 96 miles north of Montgomery, the State capital, and 168 miles west of Atlanta, on six trunk roads: the Southern, L. & N., Kansas City, M. & B., Cen-

BIRMINGHAM

tral of G., Alabama G. S. (Queen & Crescent), and Seaboard A. L. R.R.'s. It is situated in the heart of the greatest coal, iron, and limestone district of the South. Around it lie three huge coal fields, the Warrior, Cahaba, and Coosa, aggregating over 8,610 square miles, with some 60 seams, more than half of them workable; the nearest deposits being only 4 miles from the city. Birmingham is built partly upon the slope of Red Mountain, named from its outcrop of hematite iron ore, which extends many miles in every direction from the city, in a vein from 6 to 26 feet thick with an indefinite depth. This district produced in 1902 about 90 per cent of the State's production of 10,329,479 tons of coal, 2,210,735 tons of coke, and 1,472,211 tons of pig iron. Six hundred thousand freight cars were handled in and out of Birmingham, carrying 70 per cent of the entire tonnage of Alabama in 1902, and also hauling nearly 1,000,000 tons of limestone. This ideal equipment for the production of iron and steel at the lowest cost, is building up a great city with such rapidity that no statistics can be other than temporary.

Business Interests.—It is estimated that there are in Jefferson County more than 300 mining and manufacturing plants of various kinds, among which are 27 blast furnaces, 7,168 coke ovens, 60 coal mines, a large number of mines and stone quarries, 2 steel plants, 3 rolling mills, a wire rod and nail mill, a steel rail mill, besides other plants of various kinds. There are in Jefferson County 50,000 wage-earners who receive more than \$2,750,000 per month. The gross volume of business in mining and manufacturing during the year 1902 was estimated at \$60,000,000, and the gross volume of business in the general wholesale and retail trade amounted to about \$42,000,000, making the total amount of business for the year 1902, \$102,000,000. In 1901 alone, 124 new companies were organized with a capital of \$8,955,100 and existing corporations increased their capital stock \$2,650,000 and made extensions to their plants costing over \$4,000,000. The record for the year 1902 will show an increase of at least 10 per cent over the year 1901 in new companies and in additional capital. The furnaces of the district (including the suburbs, practically part of the city, though not yet formerly incorporated) turned out in 1902 1,472,211 tons of pig iron, against 1,225,308 in 1901, and 68,927 in 1880. In 1900 it furnished six sevenths of the total United States' export of pig iron, but since then none of the product has been exported on account of the increased home demand. The first steel plant in the South was started in 1897 at Birmingham, two open-hearth furnaces of 160 tons a day; now the Tennessee Coal, Iron & Railroad Company has in operation at Ensley, a suburb, 10 furnaces and a 44-inch blowing mill, capacity 1,000 tons a day. This is the largest basic open-hearth plant in the world except the Carnegie works at Homestead. There is a casting plant and rail mill in connection with it. The Alabama Steel and Shipbuilding Company began in 1899 with \$1,000,000 capital, and the Alabama Steel and Wire Company with \$2,000,000 capital. Besides the plants already mentioned, Birmingham has a steel casting plant, a bi-product plant, a wrought pipe plant, 2 cast pipe and foundry plants, 2 soil pipe plants, 1 clay pipe plant, 2 cement factories, 1 chemical works, 1 fertilizer factory, 2 breweries,

1 corn mill, 1 flour mill, 5 ice factories, 1 gas and gasoline engine works, 1 iron and steel bridge works, 2 boiler works, 6 foundries and machine shops, 1 stove foundry, 3 railroad shops, 3 sash factories, 2 wagon factories, 1 agricultural implement works, 3 printing and book-binding concerns, 1 hollow ware plant, 20 brick plants, 15 planing mills and wood-working plants, and 1 packing company. Birmingham is also a cotton market, the cotton receipts for 1901-2 amounting to 100,000 bales. It has 2 cotton factories, 2 cotton-seed oil mills, and 1 knitting factory. Besides the unparalleled cheapness of material, its transportation facilities are shortly to be greatly increased by the completion of the government improvements on the Warrior and Tombigbee rivers, by which coal and other products can be transported to tide water at Mobile, thence to the Atlantic seaboard, at greatly reduced cost.

Public Works and Institutions.—Birmingham is a handsome and solidly built city, with wide avenues, handsome dwellings, and imposing public buildings. It has a large government building, county court-house, new city hall, costing over \$200,000, and three new 10-story steel-frame "skyscrapers," one of them costing over \$600,000. Among the other notable buildings are the Jefferson Theatre, the Auditorium, St. Vincent's Hospital, Hillman's Hospital, Union Station, and Hillman Hotel. There are 16 or more public parks, the most prominent of which are the Capitol, North Birmingham, East Lake, and Lakeview. The city has an extensive waterworks system, with a reservoir on Shade's Mountain, 225 feet above the city, a Waring system of sewerage, and over 100 miles of street railroads, connecting it not only with its immediate suburbs, but with points many miles away. There are over 50 white churches, a public library, 11 hospitals and infirmaries, 13 public schools, 16 newspapers, including 3 dailies, 9 military organizations, 2 telephone companies, 13 private schools and colleges, including 1 medical college, 1 dental college, 2 business colleges, Howard College (Baptist, at East Lake, 5 miles northeast, founded 1841), Northern Alabama (Methodist) and a colored normal training school. Its charitable institutions comprise St. Vincent's Hospital, Hillman Hospital, Mercy Home, Jefferson County Alms House, and the Boys' Industrial School at East Lake.

Finances and Government.—The assessed valuation of the city property for 1902 was \$18,318,408, which is on about a 50 per cent basis; tax rate for 1902, State, county, and city, \$2.30; public outlay for 1902, including \$39,362.60 for public schools, \$463,489.69. In 1902, however, a special expenditure of \$229,856 was made for cement sidewalks, street improvements, and sewers. The government of the city is in the hands of a mayor and city council, elected biennially, and an elected police commission and a nominated board of education.

The rapid development of Birmingham's business is best shown by the infallible test of the clearing house, the only one in Alabama. In 1897 the clearings amounted to \$20,907,495; in 1899, to \$34,469,751, and in 1902 to over \$56,000,000, having nearly trebled in five years. Part of this is due to the increasing use of the Birmingham banks by territory which formerly sought those of the other large cities. The Birmingham banks furnish funds for moving

BIRMINGHAM

125,000 bales of cotton. Their business often exceeds \$1,000,000 a day. In 4 years, 1898-1902, their deposits increased from \$3,500,000 to \$9,251,820. There are 9 banking institutions in the city, 2 national, with an aggregate capital of \$1,848,500.

Population and History.—By the census, the population in 1880, the first after Birmingham's settlement, was 3,086; in 1890, 26,178; in 1900, 38,415. But these figures tell only part of the story and are very misleading. Birmingham is entirely the creation of the last 30 years. The future of the district was foreseen as early as 1849, but the first attempt to realize it was about 1870, by a company which bought a large tract of land around Elyton, then the county-seat, now a suburb of Birmingham, which sought to make that the centre of the new development. It failed because prices were too high, and another company bought a tract to the east, where stood a single shanty on the spot where the Florence Hotel now stands, which they named Birmingham. The next year a small iron furnace was erected and this started up coal mining. Coal had hitherto lacked a market, but in 1874, 50,400 tons were mined. The demand of the Oxmoor furnace for coal led, in 1879, to the opening of the Pratt mines, and with this began the era of great growth. The population leaped in the next decade from 3,000 to 26,000, a growth unparalleled in United States history, except by Chicago. Retarded for some years by the collapse of the boom, it still had grown 50 per cent by 1900. In fact, the increase was more than double that, for the nominal city is only the business hub of a large group of cities and towns, built up by the same interests and but little removed from each other, which will probably in the near future be annexed under the name Greater Birmingham, giving it a population of more than 200,000. The largest of these surrounding towns is Bessemer, 11 miles away; others are Ensley, Pratt City, Elyton, Gate City, Irondale, Powderly, West End, Smithfield, East Birmingham, North Birmingham, East Lake, Woodlawn, Kingston, Jonesville, and Avondale. The figures for the county are equally significant. When Birmingham was settled, it had 12,345 inhabitants; in 1900 it had 140,420, practically all the growth of the Birmingham district. The rapidity of the city's present growth is shown by the fact that in 1902 nearly 1,900 new dwellings and business buildings were erected, at a cost of over \$3,250,000.

ROY McCULLOUGH,

Secretary Board of Trade.

Birmingham, England, one of the greatest manufacturing cities of the world, situated on the river Rea, near its confluence with the Tame, an affluent of the Trent, in the northwest extremity of the county of Warwick, 112 miles northwest from London, and nearly in the centre of England. The lower part of the city, consisting chiefly of old houses, is crowded with workshops and warehouses, and inhabited principally by the working classes; but the upper part has some fine streets and buildings. The town-hall, built of Anglesey marble in 1832, is a rectangular building, modeled after the temple of Jupiter Stator at Rome. Its large hall is 145 feet long, 65 wide, and 65 high, can seat about 2,500 persons, and contains a magnificent organ. In this hall a great musical festival is held once every three years, the proceeds of

which go to the support of the General Hospital. It was at the Birmingham Festival of 1846 that Mendelssohn's oratorio 'Elijah' was first performed. Among the other public buildings of note are the council-house or municipal buildings for the accommodation of the different corporation offices, erected 1874-8 (cost \$1,000,000), law courts, municipal technical school, Bingley Hall, post-office, corporation baths, gun-proof office, the stations of the London & N. W., Great Western, and Midland R.R.'s, cavalry barracks, library, the Exchange buildings, art gallery, Birmingham and Midland Institute, corn exchange, Masonic Hall, markets, etc. The public statues include those of Queen Victoria, Prince Albert, James Watt, Thomas Attwood, Joseph Sturge, Sir Robert Peel, Lord Nelson, Dr. Priestley, Rowland Hill, George Dawson, Sir Josiah Mason, etc. The mother church of Birmingham is that of St. Martin's, or the Old Church, the register of which dates from the year 1544; it was rebuilt in 1875. St. Philip's is the second parish church of Birmingham (built 1711, restored 1868). Both this church and St. Martin's contain fine stained-glass windows, designed by Sir E. Burne-Jones, who was a native of Birmingham. One of the most remarkable of the Birmingham churches is the Roman Catholic Cathedral of St. Chad, a noble Gothic structure designed by Pugin, richly adorned with stained-glass windows, and containing some interesting antiquities. Among the charitable institutions the most important are the General Hospital; Birmingham and Midland Free Hospital for Children; Birmingham and Midland Eye Hospital; Women's Hospital; Ear and Throat Hospital; Orthopaedic and Spinal Hospital, Skin and Lock Hospital; Dental Hospital, etc. The principal educational institution is the Birmingham University, incorporated 1900, a growth of Mason University College, founded by Sir Josiah Mason in 1875, and further endowed by public subscription with about \$2,000,000. It has faculties of arts, science, medicine, and commerce. There are also a Roman Catholic college at Oscott; Saltley diocesan training college; the Free Grammar School, founded by Edward VI, which has a central and five branch schools; Wesleyan Theological College; Blue Coat School; Protestant Dissenters' Charity School (for maintaining and educating poor girls for domestic service); the government school of art and design; industrial schools and numerous board schools. There is a free library with 250,000 volumes, having nine branches. There are seven public parks, and several recreation grounds.

The prosperity of Birmingham is attributable to the excellence, variety, and extent of its hardware manufactures, as well as to its geographically central situation on the border of the great South Staffordshire coal and iron district, combined with the command of a wide and ready transit by canal and railway. There is an extensive system of tramways. At Soho, in the vicinity of the city, was formerly one of the largest steam-engine manufactories in the world, belonging to Boulton, partner of the celebrated James Watt. The Soho works were founded in 1757, and came into the possession of Matthew Boulton in 1762. Not a vestige of the building now remains. One of the most important manufactures is that of firearms. The number of gun-barrels tested in some recent years has

BIRNAM — BIRNEY

amounted to between 500,000 and 600,000. The manufacture of swords is also one of the staple trades. Cast-iron articles of all kinds, and of the most beautiful patterns and workmanship, are manufactured at Birmingham to a great extent. In former years iron-founding was limited to large and heavy articles, but is now extended to the lightest and most graceful, in the finishing of which bronze is very generally employed. The manufacture of railway wagons and carriages has been very extensively developed. The quantity of solid gold and silver plate manufactured is large, and the consumption of silver in plating is very great. Electro-plating was first practised in this town in 1840. Japanning, brass-founding, glass manufacturing, and glass staining or painting, are important trades. There are also large chemical works for vitriol, sal-ammoniac, cobalt, and other substances. Steel pens, of which hundreds of millions are manufactured annually, pins, fancy seals, brooches, clasps, and other trinkets are made in immense quantities. Bicycles are now made in Birmingham in greater numbers than in any other town.

By the Reform Act of 1832 Birmingham was constituted a borough, sending two members to Parliament. The act of 1867 gave it a third, while that of 1885 added four others and divided the borough into seven parliamentary districts. In 1888 it was raised by order in council to the rank of a city, and by the Local Government Act of that year it also became a county borough. In 1891 the boundaries of the borough were extended, and its area is now 12,705 acres, comprising the parishes of Birmingham and Edgbaston, and parts of others. The borough is divided into 18 wards. The municipal and parliamentary boundaries are the same, the parliamentary divisions being North, South, East, West, Central, Bordesley, and Edgbaston. Water is being brought from the Elan Valley, Wales, a distance of 80 miles, at a cost of about \$30,000,000. The corporation of Birmingham has long been recognized as in the forefront of British municipalities, a reputation which it largely owes to the work done by the Rt. Hon. Joseph Chamberlain (three times mayor). The corporation purchased the gas-works and waterworks in 1875, and the Electric Company's rights in 1898. In 1876 an "Improvement Act" was obtained, by which, at a cost of about \$10,000,000, a large area of insanitary property in the centre of the city was cleared away, and a magnificent new street—Corporation Street—laid out on the site thereof.

The city of Birmingham is supposed originally to have been a small Roman station on the Icknield Street, a Roman road of which an original portion is still visible in Sutton Park. It is known to have existed in the reign of Alfred in 872, and is mentioned in Domesday Book (1086) by the name of "Bermingeham." Another old name of the town is "Bromwycham," a form still preserved very nearly in the popular local pronunciation "Brummagem." Of the early history of the city very little is known. It was the centre of the Saxon kingdom of Mercia; and at the time of the Conquest was a place of some consideration. Leland (in Camden's 'Britannia'), writing in 1538, mentions that there were "many smythes" there, indicating that it was even then a place of some industrial importance. Birmingham was dis-

tinguished in the cause of the Parliament, and was the scene of some conflicts, in the last of which, in 1643, it suffered considerably, having been taken and partially burned by Prince Rupert, who inflicted a heavy fine on the inhabitants. It suffered to a fearful extent from the plague in 1665. Its first considerable increase in size and population took place in the reign of Charles II. Toward the middle of the eighteenth century it began to assume importance, and it has since continued to increase rapidly. The general healthfulness of Birmingham is probably due to the large quantity of open space which it possesses, to the general excellence of its drainage, greatly facilitated by the substratum of sand and gravel (belonging to the new red sandstone or Trias formation), on which it is built; and the circumstance that there is scarcely an underground dwelling or cellar within its precincts. In 1898 the birth-rate was 33.9, and the death-rate 20.4 per 1000. In 1801 the population of Birmingham was 73,670; in 1901, 522,182.

Birnam, Scotland, a hill in Perthshire, in the western highlands, Scotland, rendered famous by its connection with the history of Macbeth, and immortalized by Shakespeare. It was foretold to the ambitious thane, yet guiltless, except in thought, of bloody ambition, that, until Birnam wood should come to Dunsinane, his life and power could suffer no disaster. On the approach of Malcolm with the avenging army, composed of the loyal clans, aided by Seward, Earl of Northumberland, ignorant of the prophecy, the invaders cut down the boughs and bore them as leafy screens, by which to conceal their numbers, when the report of "the moving forest" marching upon Dunsinane struck a fatal despair into the soul of the usurper.

Birney, David Bell, American military officer (son of J. G. Birney, q.v.) b. Huntsville, Ala., 29 May 1825; d. 18 Oct. 1864. He studied law in Cincinnati, and in 1848 began practice in Philadelphia. At the outbreak of the Civil War he entered the Union army, in the summer of 1861 was commissioned colonel of the 23d Pennsylvania Volunteers; and was promoted major-general 23 May 1863. He distinguished himself in the battles of Yorktown, Williamsburg, Fredericksburg, Chancellorsville, and Gettysburg.

Birney, James G., American politician: b. Danville, Ky., 4 Feb. 1792, d. Perth Amboy, N. J., 25 Nov. 1857. He studied law, and removed early to Alabama, where he flourished in his profession and held the office of district attorney. Having had his attention turned toward the question of property in slaves, in 1833 he interested himself in the organization of a branch of the Colonization Society for the State of Alabama. Soon afterward, returning to Kentucky, he organized one there also, of which he became president. But in 1834, his views rapidly advancing, he espoused the cause of immediate emancipation in a public letter, at the same time emancipating all his own slaves, about 20 in number. Making arrangements to establish a newspaper to disseminate these views at Danville, where he resided, and where he held the situation of professor in the university, he found it impossible to have such a paper printed in Kentucky, and removed to Cincinnati, where he began to issue the *Philanthropist*. It

BIRNEY — BIRTH

had not been long published before it was found no less obnoxious to public sentiment in Ohio than it had been in Kentucky, and the press was thrown into the river. The editor, however, managed to revive the paper, and, in connection with Dr. Bailey, made it a powerful instrument in acting upon the opinion of the State. About the year 1836 he went to New York as secretary of the American Anti-Slavery Society, and for many years devoted his time and strength to the furtherance of the objects of that society by letters and articles from the press and by public addresses wherever he could make an opportunity to be heard. His purpose was to build up a political party upon the single question of slavery, to act upon the government within the forms of the Constitution; and he succeeded in forming an organization in most of the northern States, under the name of the Liberty Party. During his absence in England he was nominated in 1840 by that party for the presidency, but met with little success. He was again nominated in 1844, when he received more votes. It was charged upon his friends at the time that by withdrawing their votes from Mr. Clay, especially in the State of New York, they accomplished the election of Mr. Polk, thus aiming the death-blow at their own projects. Previous to this, in 1842, Mr. Birney had become a resident of Michigan, where not long afterward he was disabled, by a fall from his horse, from taking the active part in politics to which he had been accustomed. The latter part of his life was spent at Perth Amboy, N. J.

Birney, William, American lawyer. b. Madison County, Ala., 28 May, 1819. He was educated in Paris; took part in the Revolution of 1848, and was appointed, on public competition, professor of English literature in the college at Bourges, France. In 1861 he entered the United States army as a private, and was promoted through all the grades to brevet major-general. In 1863-5 he commanded a division. His writings include 'Life and Times of James G. Birney'; 'Plea for Civil and Religious Liberty,' etc.

Biron, bē-rōn, Baron de (ARMAND DE GONTAULT, ar-man de gōn-tō), French soldier. b. 1524; d. 1592. He took a prominent part in the civil wars between the Huguenots and Catholics, and served at the battles of Dreux, St. Denis, and Moncontour. He was made marshal of France in 1577 by Henry III. He negotiated the peace of St. Germain, and narrowly escaped the massacre of St. Bartholomew. He recovered Guenne and Languedoc from the Protestants, served in the Netherlands against the Duke of Parma, and was one of the first to recognize Henry IV as king. He distinguished himself in various battles and was killed at the siege of Epernay.

Biron, duc de (CHARLES DE GONTAULT, shārl de gōn-tō), French soldier, son of the preceding: b. about 1562; d. 31 July 1602. He served Henry IV. in the field with much zeal and courage, was raised to the rank of Admiral of France in 1592, and in 1598 was made a peer and duke. He thought himself, however, not sufficiently rewarded, and began to intrigue with the Spanish party against the king. In 1599 he concluded an agreement with the Duke of Savoy and the Count of Fuentes, by which he pledged himself to take up arms against his benefactor.

Meanwhile, war being declared against the Duke of Savoy (1600), Biron saw himself reduced to the necessity of attacking him. He still continued his negotiations with the enemy, however, and at last they became known to the king, who interrogated the marshal as to his designs, with promises of pardon. Biron made a partial confession and continued his intrigues as before. Notwithstanding this, Henry sent him in 1601, after the conclusion of peace with Savoy, as envoy to Queen Elizabeth of England. In the meantime Biron's confidant, Lafin, having become suspected by the Count of Fuentes, and beginning to fear for himself, discovered the whole plot. A frank confession and repentance would even then have saved Biron, since Henry was inclined to forgive him. He persevered in his denial, however, rejected the offers of pardon, and was therefore, at the urgent entreaties of the queen, at last surrendered to the rigor of the laws. He was tried before Parliament, and was beheaded.

Biron, Ernest John. See BIREN.

Birrell, Augustine, English essayist: b. Wavertree, near Liverpool, 19 Jan. 1850. He graduated from Cambridge and was called to the bar. He is author of charming critical and biographical essays on literary subjects, collected in the two series of 'Obiter Dicta' (1884, 2d series 1887) and 'Res Judicate' (1892, really the third of the same series). 'Men, Women, and Books' (1895) is a collection of short newspaper pieces. In 1887 he published a 'Life of Charlotte Brontë'; in 1897 edited Boswell's 'Life of Johnson,' and in 1898 published 'Life of Sir Frank Lockwood.'

Birth, or Labor, in physiology, is the act by which a female of the class Mammalia brings one of her own species into the world. When the fœtus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is extruded from its place of confinement, in order to live the life which belongs to its species independently of the mother. The womb having reached its maximum of growth with the increasing size of the fœtus, its peculiar irritability excites in it the power of contraction; it thereby narrows the space within and pushes out the mature fœtus. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. In the womb the corporeal frame of man commences existence as an embryo; after further development, appears as a fœtus; then as an immature, and finally a mature, child. With its growth and increasing size the membranes which envelop it enlarge, the womb also expanding to give room for it. At the end of the 30th or the beginning of the 40th week the child has reached its perfect state and is capable of living separate from the mother; hence follows in course its separation from her, that is, the birth.

Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, labor-pains. These are of two kinds: first, the preliminary pangs, which begin the labor, do not last long, are not violent, and produce the feeling of a disagreeable straining or pressure. When the pregnant female is attacked by these she is often unable to move from her place till the pang is over, after which

BIRTH RATE—BIRTHWORT

she is often free from pain for some hours. Then follow the true labor-pains; these always last longer, return sooner, and are more violent. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges and grows thin, and the vagina becomes loose and distensible. By this means the fœtus, as the space within the womb is gradually narrowed, descends with a turning motion toward the opening; the fluid contained in the membranes enveloping the fœtus, as the part making the greatest resistance, is forced out, and forms a bladder, which contributes much to the gradual enlargement of the opening of the womb. It is therefore injurious to delivery if hasty or ignorant midwives break the membranes too soon. By repeated and violent throes the membranes at length burst and discharge their contents, and some time after the head of the child appears. As the skull-bones have not yet acquired their perfect form and substance, but are attached at the crown of the head only by a strong membrane, and may be brought nearer together, the head, by the pressure which it undergoes, may be somewhat diminished in size and squeezed into a more oblong form, so as to pass through the opening of the matrix and the pelvis in which it is contained, and, finally, through the external parts of generation; and when this is done, the rest of the body soon follows.

The act of birth or delivery is accordingly, in general, not an unnatural, dangerous, and diseased state of the system, as many timid women imagine. It is a natural process of development, which is no more a disease than the cutting of the teeth or the coming on of puberty, although, like them, it may give rise to important changes in the body and to various diseases. It is true that the process of child-birth requires a violent exertion of nature, but this is facilitated by many preparatives and helps adapted to the purpose. If the birth succeeds in the way described, it is called a natural birth. For this it is requisite that the pelvis should be properly formed, and that the opening should permit a free passage to the perfect fœtus; that the growth and size of the fœtus should be proportioned to the pelvis, especially that the head should have the size designed by nature, proportioned to the diameter of the pelvis; also, that there should be a proper situation of the womb, in regard to the axis of the pelvis, and a proper position of the fœtus, namely, the head down, the back of the head in front and toward the opening of the womb, so as to appear first at birth; and, finally, that the external parts of generation should be in a natural state.

An easy birth takes place without any excessive strainings and in due season. A difficult birth proceeds naturally, but is joined with great efforts and pangs, and occupies a long time—over six or eight hours. The cause of it is sometimes the stiffness of the fibres of the mother, her advanced years, the disproportionate size of the child's head, and various other causes. Nature, however, finishes even these births; and women in labor ought not to be immediately dejected and impatient on account of these difficulties. An unnatural (or properly, an irregular) birth is one in which one or more of the above-mentioned requisites to a natural birth are wanting. An artificial birth is that

which is accomplished by the help of art, with instruments or the hands of the attendant. Premature birth is one which happens some weeks before the usual time, namely, after the seventh and before the end of the ninth month. Though nature has assigned the period of 40 weeks for the full maturing of the fœtus, it sometimes attains, some weeks before this period has elapsed, such a growth that it may be preserved alive, in some cases, after its separation from the mother. That it has not reached its mature state is determined by various indications. Such a child, for instance, does not cry like full-grown infants, but only utters a faint sound, sleeps constantly, and must be kept constantly warm, otherwise its hands and feet immediately become chilled. Besides this, in a premature child, more or less, according as it is more or less premature, the skin over the whole body is red, often indeed blue, covered with a fine, long, woolly hair, especially on the sides of the face, and on the back; the fontanel of the head is large, the skull-bones easily moved; the face looks old and wrinkled; the eyes are generally closed, the nails on the fingers and toes short, tender, and soft, hardly a line in length; the weight of such a child is under six, often under five pounds. The birth is called untimely when the fœtus is separated from the womb before the seventh month. Such children can be rarely kept alive; there are instances, however, of five months' children living. Some writers have contended that a seven months' child is more likely to live than one born a month later.

Late birth is a birth after the usual period of 40 weeks. As this reckoning of the time from pregnancy to birth is founded for the most part solely on the evidence of the mother, there is much room for mistake or deception. The question is one of much interest in medical jurisprudence, as the inquiry often arises whether a child born more than 40 weeks after the death of the reputed father is to be considered legitimate or not. The importance of the question and the uncertainty of the proof have occasioned a great variety of opinions among medical writers. Most of them doubt the truth of the mother's assertions about such a delayed birth, and give, as their reason, that nature confines herself to the fixed period of pregnancy; that grief, sickness, etc. cannot hinder the growth of the fœtus, etc. Others maintain, on the contrary, that nature binds herself to no fixed rules; that various causes may delay the growth of the child, etc.

Abortion and miscarriage take place when a fœtus is brought forth so immature that it cannot live. They happen from the beginning of pregnancy to the seventh month, but most frequently in the third month. The occasions, especially in those of a susceptible or sanguine temperament, are violent shocks of body or mind by blows, falling, dancing, cramp, passion, etc.

Birth Rate. See VITAL STATISTICS.

Birthmark. See NÆVUS.

Birthright, any right or privilege to which a person is entitled by birth, such as an estate descendible by law to an heir, or civil liberty under a free constitution. See PRIMOGENITURE.

Birthroot. See TRILLIUM.

Birthwort. See ARISTOLOCHIA.

BIRU — BISCHOFF

Biru, the name of a warlike chief of South America who flourished in the 16th century. During an exploring expedition of Gaspar de Morales in 1515 the Spaniards encountered a chief called Biru, by whom they were repulsed. His territory extended on both sides of the river Biru or Piru. All the country south of the Gulf of Panama was soon characterized as the Biru country. In 1526 this name was given to the empire of the Incas, now known as Peru.

Bis'cay (Spanish *VIZCAYA*, vēth-ca-ya), also called *BILBAO*, a province of Spain, forming one of the three Basque provinces (*Provincias Vascongadas*), the other two being Alava and Guipuzcoa. It lies near the northeast corner of Spain, between the Bay of Biscay and the provinces of Santander, Burgos, Alava, and Guipuzcoa. The area is 850 square miles; the population 183,098. The surface is generally mountainous; the principal river is the Nervion or Ibaizabal. In point of soil and natural productions Biscay is one of the least favored provinces of Spain; but the industry of the inhabitants has been successfully exerted in converting naturally barren tracts into fruitful fields and verdant pastures. The chief crops are maize and barley. Many fine fruits, especially nectarines, are raised; walnuts and chestnuts everywhere abound and form a considerable export to England and Germany. The cattle are of a small and inferior breed; and the rearing of sheep for wool is rendered difficult by the brushwood which covers great part of the mountain districts and tears and destroys the fleece. Fish abound along the coast, and give occupation to a great number of fishing-boats. The principal species taken are bream, tunny, cod, and anchovies. The most important mineral is iron, which is found of excellent quality throughout the province, and is extensively worked. Lead, copper, and zinc also occur. The inhabitants of Biscay, who are called Basques, are brave, active, and industrious. They inhabit not only Biscay and the other two Basque provinces strictly so called, but also the province of Navarre, and are estimated to amount in number to 650,000. The capital of Biscay is Bilbao; of Guipuzcoa, St Sebastian; of Alava, Vittoria; of Navarre, Pampeluna. The general character of these provinces resembles that of the province of Biscay. The Basque country long formed a kind of state distinct from the rest of Spain, governed according to its own ancient laws and usages.

Biscay, Bay of, that portion of the Atlantic Ocean which sweeps in along the northern shores of the Spanish Peninsula in an almost straight line from Cape Ortegal to St. Jean de Luz, at the western foot of the Pyrénées, and thence curves north along the western shores of France to the island of Ushant. Its extreme width is about 400 miles, and its length much about the same. The depth of water varies from 20 to 200 fathoms, being greatest along the northern shores of Spain. The whole of the southern coast is bold and rocky, and great parts of the French shores are low and sandy. The bay receives numerous unimportant streams from the mountains of Spain, and, through the rivers Loire, Charente, Gironde, and Adour, the waters of half the surface of France. Its chief ports are Santander, Bilbao, and San Sebastian, in Spain; and Bayonne, Bordeaux, Rochefort,

La Rochelle, and Nantes, in France. Navigation of the bay is proverbially trying to inexperienced voyagers, and is frequently rendered dangerous by the prevalence of strong winds, especially westerly ones. Rennel Current sweeps in from the ocean round the northern coast of Spain.

Bisceglie, bē-shāl-ya, Italy, a seaport town in the province of Bari, 13 miles east-southeast of Barletta, on a rock on the western shore of the Adriatic, surrounded by walls, and in general badly built. It has a cathedral, two collegiate and several other churches, convents for both sexes, a seminary, and hospital. The port admits vessels of small burden only. The town being almost destitute of water, rain is collected in large cisterns cut in the solid rock. The neighborhood produces good wine. Important fairs are held here twice a year. Pop. (1901) 30,855.

Bischof, Karl Gustav Christoph, bish'ōf, kār'l goo'stav kris'tōf, German geologist and chemist: b. Nuremberg, 18 Jan. 1792; d. Bonn, 30 Nov. 1870. He studied in Erlangen; became professor of chemistry and technology there in 1819, and professor of chemistry and mineralogy at Bonn in 1822. He devoted himself especially to geological research and advanced some entirely new opinions in regard to the formation of mountain ranges. In connection with his work in this line he wrote 'The Volcanic Mineral Springs of France and Germany'; 'Concerning Glaciers and their Relation to the Elevation of the Alps'; and 'Concerning the Formation of Quartz and Metal Ores.' His paper on internal terrestrial heat received a prize from the Scientific Society of Holland; and he also published in English 'Researches on the Internal Heat of the Globe.' His greatest work 'Text-book of Chemical and Physical Geology' is an important contribution to the development of that phase of geological research.

Bischoff, Joseph Eduard Konrad, bish'ōf, yō'sēf ēd'oo-ard kōn'rād, German novelist: b. Niedergailbach, 9 Aug. 1828. He was fitted for the priesthood, studying at the Catholic Seminary at Munich, and was ordained a priest, but later gave his whole attention to literary work and wrote a number of novels in which he attacks the Protestant Reformation and the modern movement in literature and science. Among his works are 'Historical Novels concerning Frederick II and his Time'; 'Gustavus Adolphus'; 'The Free Thinkers'; 'The Social Democrats and their Fathers'; and 'Otto the Great'.

Bischoff, Theodor Ludwig Wilhelm, tā'ō-dōr lood'vig vīl'hēlm, bish'ōf, German physiologist: b. Hanover, 28 Oct. 1807; d. Munich, 5 Dec. 1882. He was educated at Bonn; was lecturer in the university there in 1833; and professor at Heidelberg in 1836; in 1844 he went to the university at Giessen; and in 1855 to Munich, retiring from active work in 1878. His chief work was a series of books on the history of the development of man and some of the higher animals, and his 'Evidence of the Periodic Ripening and Detachment of the Ova, independently of Generation in Man and the Mammals.' He also established the presence of carbonic acid and oxygen in the blood, and studied the difference between man and the anthropoid apes.

BISCHOFF — BISHOP

Bischoff, Mount, Tasmania, a town 60 miles west of Launceston, which owes its existence to the discovery here in 1872, by James Smith, of some of the richest tin mines in the world. Between 1884-6 more than 20,000 tons of tin ore had been mined. The yield of pure tin from the ore is from 70 to 80 per cent. There is railway communication with Emu Bay, 45 miles distant.

Biscuit, a thin cake, baked until crisp and dry. In this shape it is known in the United States as a cracker; the name biscuit being applied to a soft cake made from dough raised with yeast. Plain biscuits are more nutritious than an equal weight of bread, but owing to their hardness and dryness, they should be more thoroughly masticated to insure their easy digestion. When exposed to moisture, biscuits are apt to lose their brittleness and become moldy, hence it is necessary to keep them in a dry atmosphere. Digestive biscuits consist almost entirely of bran. Charcoal biscuits contain about 10 per cent of powdered vegetable charcoal. Meat biscuits, which are very nutritious, contain either extract of meat, or lean meat which has been dried and ground to a fine powder.

In pottery, articles molded and baked in an oven, preparatory to the glazing and burning. In the biscuit form, pottery is bibulous, but the glaze sinks into the pores and fuses in the kiln, forming a vitreous coating to the ware.

Bisharrin, *bē-sha-rēn'*, a tribe of northeast Africa, forming the northern division of the Beja, said to be the Kushites of the Bible. They live between the Red Sea and the Nile and between Egypt and Abyssinia; they are nomadic in habit and nominally Mohammedans. They are of Caucasian race and speak a well-developed Hamitic language.

Bishop, Anna Riviera, English singer: b. London, 1814; d. New York, 18 March 1884. She married Sir Henry Rowley Bishop, the composer, in 1831, and was married a second time to Mr. Schultz of New York in 1858. She made her first appearance as a concert singer in 1837; made a tour of the Continent in 1839; and 1847 sang in United States, Canada, and Mexico, where she was very popular. She lost her voice in 1868.

Bishop, Sir Henry Rowley, English musical composer: b. London, 18 Nov. 1786; d. 30 April 1855. He was trained to his profession under Signor Bianchi, composer to the London Opera House. In 1809 his first important opera, the 'Circassian Bride,' was produced at Drury Lane with great success; but the following evening, the theatre, with the score of Bishop's opera, was consumed by fire. Numerous operas and other musical pieces now followed of his composition, and from this period to 1826 upward of 70 works were produced by him. Among others may be mentioned the music of 'Guy Mannering'; 'The Slave'; 'The Miller and His Men'; 'Maid Marian'; 'The Virgin of the Sun,' and adaptations of 'The Barber of Seville' and the 'Marriage of Figaro.' From 1810 to 1824 he acted as musical composer and director to Covent Garden Theatre. He also arranged several volumes of the 'National Melodies,' and completed the arrangement of the music for Moore's 'Irish Melodies,' commenced

by Sir John Stevenson. In 1826 Bishop produced an opera called 'Aladdin,' which was not successful. He was elected Reid professor of music in Edinburgh University in 1841, was knighted in 1842, and in 1848 became professor of music in the University of Oxford. Some of his work is the most popular of all music among English-speaking people, particularly his setting of John Howard Payne's 'Home Sweet Home,' and 'When the Bloom is on the Rye.'

Bishop, Isabella (BIRD), English author and traveler: b. Boroughbridge Hall, Yorkshire, 15 Oct. 1832. She began to travel at the age of 22 and made her first trip abroad in 1855, when she visited Prince Edward's Island and the United States, and has since circumnavigated the globe three times. In recent years she has spent much time in Japan, and in 1894-5 made her third trip to Korea. She was in Seoul when the war broke out, 1894, and was the first person whose war correspondence reached London. She is a Fellow of the Royal Geographical Society, and is constantly sending it papers on her travels. In 1892 she was elected the first lady Fellow of the Royal Geographical Society and in 1901 rode 1,000 miles in Morocco. She was married in 1881 to John Bishop, who died five years later. Her publications include: 'The English Woman in America' (1856); 'Six Months in the Sandwich Islands' (1873); 'The Hawaiian Archipelago' (1875); 'A Lady's Life in the Rocky Mountains' (1874); 'Unbeaten Tracks in Japan' (1880); 'Journeys in Persia and Kurdistan' (1892); 'Among the Tibetans' (1894); 'Korea and Her Neighbors' (1898); 'The Yangtze Valley and Beyond' (1899); 'Pictures from China' (1900), the three last-named works being the result of three years of Asiatic travel.

Bishop, John Remsen, American educator: b. New Brunswick, N. J., 17 Sept. 1860. He was graduated at Harvard University in 1882; taught Greek and English at St. Paul's School, Concord, N. H., in 1882-3; was principal of the Princeton Preparatory School in 1884-7, instructor of Greek and Latin at Hughes High School, Cincinnati, in 1888-95; and became principal of the Walnut Hills High School, Cincinnati, in 1895. He is the author of 'Virgil's Georgics Edited for Sight Reading,' and of numerous papers and articles on pedagogical subjects; editor of 'Cicero's Orations'; an active promoter of local and national educational organizations; and a member of the American Social Science Association.

Bishop, Louis Faugeres, American physician: b. New Brunswick, N. J., 14 March 1864. He graduated at Rutgers College in 1885, and at the New York College of Physicians and Surgeons in 1889. He was resident physician of St. Luke's Hospital, New York, in 1889-92, and secretary of the New York Academy of Medicine and chairman of its Section of Medicine in 1900. His publications include 'Theory and Treatment of Rheumatism'; 'Diagnosis and Treatment of Gout'; 'Important Points in the Treatment of Pneumonia,' etc.

Bishop, Seth Scott, American physician: b. Fond du Lac, Wis., 7 Feb. 1852. He graduated at the Northwestern University in 1876. He began practice in Chicago, and in 1900 was professor of otology in the Chicago Post-Graduate Medical School and Hospital; Profes-

BISHOP

sor of diseases of the nose, throat, and ear in the Illinois Medical College; and surgeon to the Illinois Hospital and the Post-Graduate Hospital. He was also consulting surgeon to the Mary Thompson Hospital, the Illinois Masonic Orphan's Home in Chicago, and the Silver Cross Hospital in Joliet. He was a member of the International Medical Congress, the Pan-American Medical Congress, the American Medical Association, etc. He has written 'Diseases of the Ear, Nose, and Throat, and Their Accessory Cavities,' besides many monographs, and is one of the editors of 'The Laryngoscope.'

Bishop, William Henry, American novelist · b Hartford, Conn., 7 Jan. 1847. He was graduated at Yale in 1867, and became professor of Spanish language and literature in its scientific school (Sheffield), resigning in February 1902 to spend several years in travel in Spain and elsewhere, in preparation for a list of new works in the fields of travel and fiction. He is the author of several novels, including 'Detmold' (1879); 'The House of a Merchant Prince' (1882); 'A Pound of Cure: A Story of Monte Carlo' (1894); 'Fish and Men in the Maine Islands'; 'A House Hunter in Europe'; 'Writing to Rosina,' a story; 'The Golden Justice'; 'Choy Susan and Other Stories'; 'The Brown-Stone Boy and Other Queer People,' and many similar works; also a book of travel, 'Old Mexico and Her Lost Provinces.'

Bishop-Auckland, England, a market town, in the county and nine miles southwest from the city of Durham, is situated on an eminence at the confluence of the Gaunless with the Wear, and has much improved in recent times. Near it is Auckland Palace, the episcopal residence, and among its buildings are a free grammar school (founded 1605), St. Anne Chapel, Edgar Memorial Hall, Lightfoot Church Institute, and the Temperance Hall. It is almost wholly supported by the coal traffic. Pop (1901) 11,966.

Bishop (Sax *biscop*, from Gr. *episcopos*, a superintendent), in the Greek, Latin, and Anglican churches, the title given to those who are of the highest order of the priesthood, to the successors of the 12 apostles, in distinction from the priests who are the successors of the 72 disciples; in the Methodist Episcopal and Moravian churches, and in the Protestant churches of Sweden, Norway, and Denmark, it is the title given to the highest officers in the ministry, who are not, however, regarded as a distinct order; in Germany the office is hardly more than titular, and is conferred upon princes as well as ecclesiastics. The name was borrowed by the first Christians from the languages of Greece and Rome, in which it designated a civil magistrate. Thus, Cicero was at one time *episcopus ora campania*. In the New Testament, the words bishop and presbyter, or priest, are sometimes interchanged, as in Acts xx 17, 28, and St John, in his last two epistles, adopts the title of priest. Yet, as maintained by Roman Catholic writers, it does not follow because the names priest and bishop were then applied indistinctly, that there existed no distinction between the episcopate and the priesthood. "There might have been confusion in the names," says St. Thomas, "but not in the character." The identity of the original signification of the words "presbyter" and "bishop" was acknowledged by

the Christian fathers St. Jerome and St. Augustine in the 5th century, and even by Pope Urban II. at the end of the 11th century, and it is not denied by many Episcopalians even at the present day. By the Council of Trent, however, the doctrine which placed presbyters and bishops originally on a footing of perfect equality in the early Church was declared as a heresy, the object of which was to deny to the bishops of the Church the priority of rank which they claimed.

Those who adhere to the Episcopalian form of Church government, and at the same time admit the original identity of presbyters and bishops, differ from the Presbyterians in their theory of the origin of the episcopal authority. The Episcopalians maintain that even before the words had a separate meaning attached to them the distinction between bishops and subordinate pastors existed in fact, and was a regular ecclesiastical institution, those who held a peculiar authority over others being appointed originally by the apostles. The Presbyterians, on the other hand, believe that the authority that was undoubtedly conceded to certain of the "bishops" or "presbyters" when they met to consider the affairs of the Church, was not due to any formal appointment, but merely to the mutual agreement of the assembled presbyters, and that this distinction was no more than a mark of respect paid to some member who was venerable by his age or distinguished by his piety. But, whichever of these two theories may be correct, there is no doubt of the fact that a comparatively early period in the history of the Church a position of authority was acquired by the pastors of the Christian communities belonging to certain places, and that these came to be distinguished from the others by the name of bishops. The growth of this authority was favored by the doctrine which we find stated in the beginning of the 2d century with regard to the priestly dignity being a peculiarly divine institution. The more this doctrine was affirmed the higher grew the claims of the bishops. Ignatius of Antioch, who died about 115, had already declared every bishop to be a representative of Christ, in which we have the statement of the doctrine of the apostolic succession, that is to say, the doctrine of the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. By the foundation of new churches in the larger towns which were affiliated to the original churches, and by the dependence of the presbyters in the country districts upon those having urban charges, the authority of the bishops came to be gradually extended over greater or less dioceses; and at the same time the bishops began to reserve to themselves peculiar privileges. As the early Church advanced and increased in growth, the offices and jurisdiction of the bishops developed correspondingly and by the 2d century their duties are clearly marked off from the subordinate clergy.

While this then was the position of the bishops in relation to the presbyters, they at first considered themselves as standing on a footing of equality in relation to each other. But as certain of the presbyters in their assemblies had acquired a priority of rank over the others, it gradually came about in the same

BISHOP

way that the bishops of the chief cities (Jerusalem, Antioch, Corinth, Alexandria, Constantinople, Rome) obtained a similar precedence among the bishops, and received the title of metropolitan bishops; and very early in the history of Christianity we find the Bishop of Rome claiming to be the head of the Church as the true successor of Peter, whom Christ himself had pronounced to be the rock on which he would build his Church. Roman Catholic writers found this supremacy of Peter upon the evidence of Scriptures, upon the *a priori* argument of the necessity of one supreme head both in the matter of government and the preservation of the integrity of doctrine, and upon the testimony of early ecclesiastical writers, who witness to the tradition of the universal supremacy of the Roman see.

After the transfer of the capital of the Roman empire to Constantinople, this city rapidly rose to ecclesiastical importance and became a metropolitan see. Its bishops made claim to be the first see in the Christian world after Rome on account of the imperial dignity of the city, but this assumption was stoutly resisted by the apostolic sees of the East, whom Rome always sustained against Constantinople's claim. After the Greek schism, Constantinople assumed the primacy of the Greek Church.

The practice of solemnly investing bishops with their offices dates from the 7th century. Already in the 5th century the Popes had begun to send to the newly elected metropolitan bishops (now called archbishops) the pallium, a kind of official mantle worn by archbishops, as a token of their sanction of the choice. Two centuries later it became the custom to consecrate bishops by investing them with the ring and crosier, the former as a token of marriage with the Church, the latter as a symbol of the pastoral office. Since this investiture was what gave validity to the election of the bishops, it became the source of long-continued contests between the Popes and the temporal sovereigns in the Middle Ages. The influential position which the bishops occupied in the state caused the temporal rulers to be desirous of keeping the right of investiture in their own hands, while the Popes with equal determination claimed the right for themselves. The contest was most bitter between the Popes and the emperors of the Romans, as they were called. It began in the 11th century, but was not settled till 1122, when it was agreed in the concordat of Worms between Pope Calixtus II. and the Emperor Henry V that the election of bishops should take place according to the laws of the Church, under the direction of the emperor, and that the spiritual investiture (with ring and crosier) should remain in the hands of the Pope, while the bishops were to be invested with the temporal rights of their office by the emperor. This is still the fundamental law of the Roman Catholic Church with regard to investiture. The election to a bishopric is for the most part in the hands of the dean and chapter of the cathedral of the diocese; but in some cases it is a right of the territorial sovereign. In any case papal confirmation is requisite before the appointment is complete. Roman Catholic bishops in England are appointed exclusively by the Pope.

When the system of the ecclesiastical rule was matured, the almost absolute authority which

they exercised over the clergy of their dioceses; their intervention in the secular concerns of the governments, to which they soon rendered themselves necessary by their superior information and their elevated rank; the administration of the Church revenues; and their extensive ecclesiastical as well as criminal jurisdiction, drew them into the vortex of secular affairs, sometimes at spiritual expense. Still it continued to be the bishop's duty to teach and preach in his own diocese, to watch over purity of doctrine, to see that the people were provided with the sacraments, to visit the churches in his diocese, etc. The most distinctive functions of their spiritual office remained as they still are, the ordination of the clergy, the consecration of other bishops, the confirmation of youth, the consecration of churches, etc. In the Middle Ages they attached to themselves subordinate or assistant bishops called suffragans or coadjutors, who often had intrusted to them the performance of those functions which more especially concerned the Church. The episcopal office being such as we have described it, the nobility, and even the sons of princes and kings, strove to obtain a dignity which was as honorable as it was profitable, and was not deemed incompatible with festivities and luxurious enjoyments. The splendid establishments which they were able to maintain from the large revenues derived chiefly from rich donations to their churches by pious devotees, gave, to the bishops of Germany particularly, a high degree of dignity. They became princes of the empire, and their influence on public affairs was highly important.

The Reformation lessened the number of bishops, and though in some of the Protestant countries of the north of Europe the higher clergy have retained the title of bishop, yet they have lost the greater part of their former revenues and privileges, though in neither of these particulars have those of England any reason to complain. The English Church has left to its bishops more authority than the rest, and this is one reason why it bears the name of episcopal. To them belong ordination, confirmation, the consecration of churches, the licensing of curates, and institution to benefices. They receive their appointment from the Crown. In Prussia, though the majority of the population are Protestants, the Roman Catholic bishops receive an annual allowance from the state. Some bishops in the Roman Catholic Church are nominally in charge of dioceses in countries which do not acknowledge the Christian faith. The dioceses of such bishops are said to lie *in partibus infidelium* (in parts belonging to unbelievers), and they are chiefly those that were wrested from the Christian Church by the Mohammedans.

The appointment of bishops was one of the grievances of the American colonists; few things more exasperated them than the scheme of appointing and sending out a bishop from England. It is said that there was a project of making Dean Swift bishop of the American colonies. In 1771, at the instance of the clergy of New York and New Jersey, the plan was again urged. The clergy of Virginia generally assented, but throughout America the dissenters and the Episcopal laity opposed. After the Revolution the case was altered. The first Episcopal bishop, Samuel Seabury, of Connecticut,

BISHOP'S BOOK — BISMARCK-SCHÖNHAUSEN

was consecrated by Scotch non-juring bishops in 1784. The Methodists began to use the term bishop in 1787. The first Roman Catholic bishop, John Carroll, of Baltimore, was consecrated in 1790. See **ARCHBISHOP; APOSTOLIC SUCCESSION.**

Bibliography—Baur, 'Christianity and the Church in the First Three Centuries'; Dollinger, 'The First Age of the Church'; Hatch, 'Organization of the Early Christian Churches'; Lightfoot, 'St. Paul's Epistle to the Philippians'; Moberly, 'Ministerial Priesthood.'

Bishop's Book, a handbook of instruction and doctrine compiled in 1537 by a committee of bishops and ministers of the Anglican Church. It is to be found in 'Formularies of the Faith Put Forth by Authority During the Reign of Henry VIII.'

Bishops Suffragan, a class of bishops in England appointed by the Crown to take the places of the early bishops *in partibus*, who were assistants to the active bishops of English sees, and who held their warrant at the pleasure of the bishops to whom they were assigned. They were distinguished from suffragan bishops in the Church of England, as every regular bishop was a suffragan of his superior or metropolitan.

Biskara, bēs'ka-ra, or **Biskra**, Algeria, a town situated at the southern base of the last spurs of the Aures Mountains, about 120 miles south-southwest of Constantine. The railway from Philippeville, on the Mediterranean, terminates here. New Biskara, or the French town, has (1903) 9,076 inhabitants. Old Biskara, which is inhabited chiefly by Arabs, Berbers, and Negroes, has a population of about 75,000.

Bismarck-Schönhausen, Hubert Nikolaus, Prince von, hū'bert nīk'ō-lōws bēs'mark-shen'how-sēn, German statesman. b Berlin, 28 Dec. 1849; son of Otto Eduard Leopold, Prince von Bismarck-Schönhausen. He served as secretary to the London Embassy, and on his father's retirement he was provisionally charged with the foreign affairs of the empire. In 1886 he was secretary of state, and in January 1889, the emperor conferred on him the first class of the Order of the Red Eagle. When his father resigned, Hubert withdrew from the diplomatic service, and remained upon his estate for several years. In 1893 and 1898 he was a member of the Conservative party in the Reichstag. His speeches are published under the title, 'Politische Reden' (1899).

Bismarck-Schönhausen, Otto Eduard Leopold, Prince, ōt'ō ēd'ōo-ard lā'ō-pōld bēs'mark-shen'how-sēn. b of a noble family of the "Mark" (Brandenburg), at Schönhausen, 1 April, 1815; d. 30 July 1898. He studied at Göttingen, Berlin, and Greifswald; entered the army and became lieutenant in the Landwehr. After a brief interval devoted to his estates and to the office of inspector of dikes, he became in 1846 a member of the provincial diet of Saxony. And later he entered the diet of Prussia, when he began to attract attention as an Ultra Royalist. He opposed the scheme of a German empire as proposed by the Frankfurt Parliament of 1849. His diplomatic career began in 1851, when he was appointed Prussian member of the resuscitated German diet at Frankfurt. In the diet, he gave open expression to the long-felt discontent with the predominance of Austria, and demanded equal rights for Prussia.

He remained at Frankfurt till 1859, when he beheld in the approach of the Italian war an opportunity of freeing Prussia and Germany from the dominance of Austria. In the spring of 1862 King William, on the urgent advice of the Prince of Hohenzollern, transferred Bismarck as ambassador to Paris, in order to give him an insight into the politics of the Tuileries. During his short stay at Paris Bismarck visited London, and had interviews with the leading politicians of the time, including Lord Palmerston and Disraeli. In the autumn Bismarck was recalled, to take the portfolio of the ministry of foreign affairs, and the presidency of the cabinet. Not being able to pass the reorganization bill and the budget, he closed the chambers (October 1862), announcing to the deputies that the king's government would be obliged to do without their sanction. When the "conflict era," as it was called, approached a crisis, the death of the king of Denmark reopened the Schleswig-Holstein question, and excited a fever of national German feeling, which Bismarck was adroit enough to work so as to aggrandize Prussia by the acquisition of the Elbe duchies.

The action of France in regard to the candidature of Prince Leopold of Hohenzollern for the throne of Spain gave Bismarck the opportunity of carrying into action the intensified feeling of unity among Germans. During the war of 1870-1, Bismarck was the spokesman of Germany; he it was that in February 1871, dictated the terms of peace to France. Having been made a count in 1866, he was now created a prince and chancellor of the German empire. Following the Peace of Frankfurt (10 May 1871), the sole aim of Bismarck's policy, domestic and foreign, was to consolidate the young empire of his own creating. Thus, conceiving the unity of the nation and the authority of its government to be endangered by the Church of Rome, and its doctrines of papal infallibility, he embarked on that long and bitter struggle with the Vatican, called the Kulturkampf, in the course of which the Imperial and Prussian parliaments passed a series of most stringent measures (Falk or May laws) against the Roman Catholic hierarchy. But Bismarck had underrated the resisting power of the Roman Catholic Church, and motives of political expediency gradually led him to modify or repeal the most oppressive of the anti-papal edicts, leaving the Roman Catholics virtual masters of the field. Otherwise, his domestic policy was marked, among other things, by a reformed coinage, a codification of law, a nationalization of the Prussian railways (as a preliminary step to Imperial State lines), fiscal reform in the direction of making the empire self-supporting (that is, independent of matricular contributions from its component states), repeated increase of the army and the regular voting of its estimates for seven years at a time (military septennate), the introduction of a protective tariff (1879), and the attempt to combat social democracy.

In 1884 Bismarck inaugurated the career of Germany as a colonizing power, a new departure which brought him into sharp but temporary conflict with the England of Gladstone. For the rest, his foreign policy mainly aimed at isolating France and rendering her incapable of forming anti-German alliances. On the other hand, he

BISMARCK—BISMUTH

gradually combined the central powers of Europe into a peace league, aiming at counteracting the aggressiveness of Russia and France, separately or combined, on the Danube or the Rhine. The nucleus of this peace league was formed in 1879 by the Austro-German Treaty of Alliance (published in February 1888) which Italy formally joined in 1886, and which entitles Bismarck to be called the "peacemaker" and the "peacekeeper" of Europe, a character he first publicly acquired when, as "honest broker" between Austria and Russia, he presided over the Berlin Congress in 1878. The phrase, "man of blood and iron," is based on the Iron Chancellor's own use of the words in a speech in 1862.

Bismarck's life was often threatened, and twice actually attempted—once at Berlin in 1866, just before the Bohemian campaign, by Ferdinand Cohen (or Blind), a crazy youth who aimed at making himself the instrument of popular dissatisfaction with Bismarck, as the champion of absolutism and the fancied apostle of a fratricidal war; and again in 1874 at Kissingen, by a Roman Catholic tinsmith named Kullmann, who was unquestionably a product of Ultramontane fury engendered by the May laws.

Emperor William died 9 March 1888. The short reign of Emperor Frederick followed and then William II. ascended the throne. On 18 March 1890 Bismarck fell. The last cause of his fall has not been told. Many explanations have been given—that Bismarck objected to the labor rescripts, that he opposed the abolition of the laws against Socialists, that he would not tolerate the emperor's direct consultation with the other ministers or the parliamentary leaders. After the war with Denmark, King William had made Bismarck a count. After the conquest of France, Emperor William had named him prince. Emperor William II gave him the title of Duke of Lauenburg. When Bismarck's 81st birthday was celebrated in 1896, there was talk of a reconciliation between the prince and his sovereign. The emperor sent his photograph to Bismarck, the latter returned thanks, and little by little the way was paved for a meeting between the two men, and eventually for the state visit which the emperor paid to Bismarck at Friedrichsruhe, where the statesman died.

Bibliography.—Bismarck's 'Autobiography'; Busch, 'Bismarck: Some Secret Pages of His History' (2 vols.); Blum, 'Das Deutsche Reich zur Zeit Bismarcks'; Sybel, 'The Founding of the German Empire'; Dawson, 'Bismarck and State Socialism'; Munroe-Smith, 'Bismarck and German Unity'; Hoche, 'Bismarck at Home'; Hayward, 'Bismarck in Private Life'; and 'Lives,' by Gorchach, Jacks, Lowe, and Stearns.

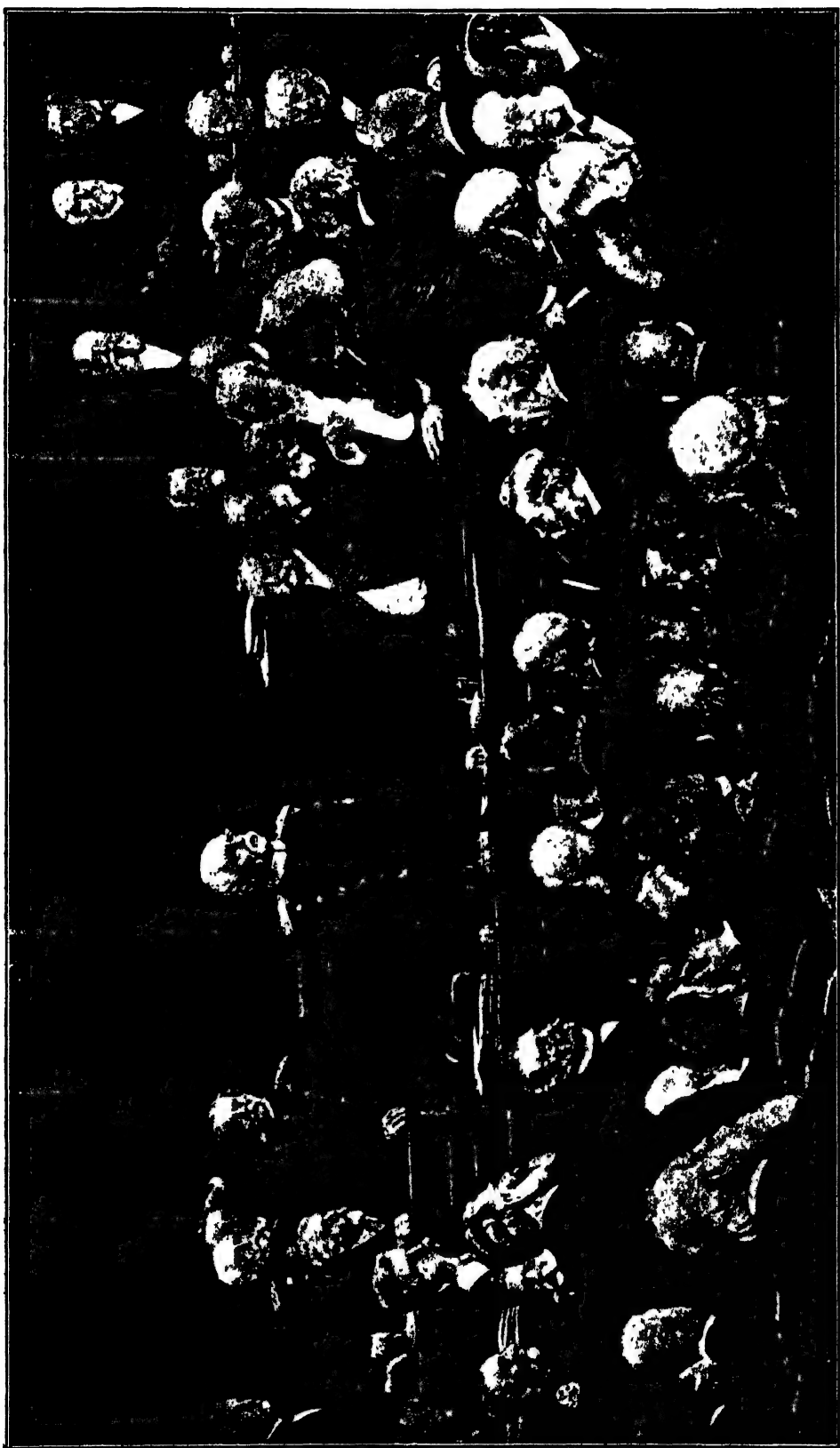
Bismarck, N. Dak., city and capital of the State; and county-seat of Burleigh County; on the Missouri River, and the Northern Pacific R.R.; 194 miles west of Fargo. It contains the State capitol (which cost over \$500,000), the State penitentiary, court-house, city hall, opera house, a State hospital for the insane, Saint Alexius' Hospital, Saint Paul's Seminary, and an immense river warehouse. The river is here spanned by a bridge that cost \$1,500,000. Bismarck has improved waterworks, electric lights, several flour mills, a national

bank, the State Library, and an assessed property valuation of nearly \$2,000,000. The city is a supply and trade centre for an extensive agricultural section, and is also a base of supplies for Indian agencies and United States military posts. Its river traffic with stations above and below it, is very heavy. Pop. (1890) 2,186; (1900) 3,319.

Bismarck Archipelago, official name given by Germany to New Britain, New Ireland, New Hanover, and several smaller adjoining islands in the South Pacific, since in 1884, when they became a German dependency.

Bismark, Friedrich Wilhelm, frēd'rih vīl'hēlm, bēs'mark (COUNT VON), German general: b. Windheim, Westphalia, 28 July 1783; d. 18 July 1860. In 1796 he entered the army of Hanover as an ensign, and in 1804 was attached to the Hanoverian legion in the English army. The result of a duel forcing him to leave the English service, he entered that of the king of Wurtemberg, in 1807, and was soon after appointed captain of cavalry. During the campaign in Russia, he served under the command of Ney, and distinguished himself at the Beresina. He was made a prisoner at Leipsic, but returned to Wurtemberg in 1813. In 1815 he received the title of count; in 1819 he was appointed brigadier-general. In 1828 Count Bismark introduced his system of cavalry tactics into the Danish army, and was soon after appointed commander-in-chief of the cavalry of Wurtemberg. He published several military treatises, and also a work upon Russia.

Bismuth, biz'mūth, a metallic element, first accurately described by Pott in 1739. It was known before that time, but had been previously confounded with antimony and zinc, which it resembles to some extent. The origin of the word "bismuth" is not known, although several highly improbable derivations have been suggested. For example, miners often call the metal "wismuth," and Mathesius suggests that this word comes from "Wisse," or "Wiese," meaning a meadow; because, he says, in the mines it is often found covered with incrustations of various colors, resembling a meadow covered with brilliant flowers. Bismuth occurs in nature in the metallic form, and several ores of it are also known, from which the metal may be easily obtained by roasting and smelting. The principal supply comes from Saxony, but considerable quantities are obtained from Austria, Norway, Cornwall, Spain, California, New South Wales, and portions of South America. The total consumption of the metal probably does not greatly exceed 50 tons per annum, and the demand for it is so variable that the price has ranged all the way from 50 cents to \$5 a pound. Bismuth is of a peculiar light-red-dish color, and is highly crystalline, and so brittle that it can be readily pulverized. It melts at 510° F., and boils in the vicinity of 2300° F. Its specific gravity is about 9.82 at 54° F., that of the melted metal, just above the point of fusion, being 10.06. Its specific heat is about 0.030 at ordinary temperatures, and 0.036 just above the melting point. Its coefficient of expansion is about 0.000736 per degree Fahrenheit, its conductivity for heat is about one fiftieth of that of silver, and its electrical resistance at 32° F. is 1.15 times that of mercury at the same



BISMARCK ADDRESSING THE REICHSTAG.

BISMUTHINITE — BISON

temperature. Bismuth is readily recognized by the spectroscope, as it shows a large number of characteristic lines. Its chemical symbol is Bi, and its atomic weight is 208.5 for $O=16$, and 206.9 for $H=1$. It has a tensile strength of 6,400 pounds per square inch. According to some authorities, the specific gravity of metallic bismuth is diminished by pressure; but Spring has shown that this is not the case. He subjected a sample whose specific gravity was 9.804 to a pressure of 20,000 atmospheres, and found that the specific gravity rose to 9.856, while a second compression increased it still further, to 9.863. Bismuth expands upon solidifying, but Tribe has shown that this expansion does not take place until immediately after the congelation of the metal. Bismuth is the most diamagnetic substance known, a sphere of it being sensibly repelled by a magnet. It has marked thermo-electric properties also, on account of which it is much used in laboratories in the construction of delicate thermo-piles. In the arts, metallic bismuth is used chiefly in the preparation of alloys. By adding a small amount of it to lead, that metal may be hardened and toughened. An alloy consisting of three parts of lead and two of bismuth has 10 times the hardness and 20 times the tenacity of pure lead. The alloys of bismuth with both tin and lead are extremely fusible, and take fine impressions of casts and molds. An alloy of one part of bismuth, two parts of tin, and one part of lead, is used by pewter workers as a soft solder, and by soap-makers for molds. An alloy containing five parts of bismuth, two of tin, and three of lead melts at $199^{\circ} F.$, and is somewhat used for stereotyping, and for the manufacture of metallic writing pencils. Thorpe gives the following proportions for the better known fusible metals, into which bismuth enters:

Newton's. Bismuth, 50; lead, 31.25; tin, 18.75. Melts at $202^{\circ} F.$

Rose's. Bismuth, 50; lead, 28.10; tin, 24.10. Melts at $203^{\circ} F.$

D'Arcet's. Bismuth, 50; lead, 25; tin, 25. Melts at $201^{\circ} F.$ (If 250 parts of mercury are also added, the resulting alloy, or amalgam, melts at $113^{\circ} F.$)

Wood's. Bismuth, 50; lead, 25; tin, 12.50; cadmium, 12.50. Melts at $149^{\circ} F.$

Lipowitz's. Bismuth, 50; lead, 26.90; tin, 12.78; cadmium, 10.40. Melts at $149^{\circ} F.$

Guthrie's "eutectic" alloy: Bismuth, 50; lead, 20.55; tin, 21.10; cadmium, 14.03. Melting point not definitely stated, but said to be "very low."

The action of heat upon some of the foregoing alloys is remarkable. Thus, Lipowitz's alloy, which solidifies at 149° , contracts very rapidly at first, as it cools from this point. As the cooling goes on, the contraction becomes slower and slower, until the temperature falls to $101.3^{\circ} F.$ From this point the alloy expands as it cools, until the temperature falls to about $77^{\circ} F.$, after which it again contracts, so that at 32° a bar of the alloy has the same length as at $115^{\circ} F.$ Alloys of bismuth have been used for making fusible plugs for steam boilers, but it is found that they are altered in some unknown way by prolonged exposure to heat, so that they cannot be relied upon, after any great length of time, to melt at the proper temperature. Some of the alloys of bismuth are also used in tempering steel.

In its compounds, bismuth has an odd valency—usually three, but sometimes five. Metallic bismuth does not oxidize readily in dry air at ordinary temperatures, but it burns with a blue flame when strongly heated in presence of air, passing into the trioxid, Bi_2O_3 . If the trioxid is dissolved in a solution of caustic potash, and nitric acid is subsequently added, bismuth peroxid (or pentoxid, Bi_2O_5 , is precipitated. The trioxid is pale yellow, and the pentoxid is brownish-red. Both unite with acids to form salts. Bismuth trichlorid, $BiCl_3$, is formed when the metal is heated in chlorine gas; it is a white, crystalline, deliquescent substance, which is decomposed by water with the formation of hydrochloric acid and bismuth oxychlorid, $BiOCl$. Bismuth trisulphid, Bi_2S_3 , is thrown down as a black, insoluble precipitate, when a stream of sulphuretted hydrogen gas is passed through an acid solution of a salt of bismuth. The trisulphid also occurs native as "bismuth glance," or Bismuthinite (q.v.). Bismuth dissolves readily in nitric acid, with the formation of the nitrate, $Bi(NO_3)_3 + 5H_2O$. A peculiarity of the soluble bismuth salts, as a class, is that their solutions are rendered milky by the addition of water in considerable excess, owing to the formation of insoluble basic compounds. The nitrate, for example, becomes transformed by this process into a series of so-called sub-nitrates.

In medicine, bismuth is used in the form of some one of this metal's insoluble salts, the soluble salts of bismuth being actively poisonous. The poisoning closely resembles that caused by lead (q.v.). The insoluble salts used most frequently are bismuth subnitrate, subcarbonate, salicylate, and subgallate. These are for the most part employed as gastric sedatives, as gastro-intestinal anti-fermentatives, and locally as bland astringent dressings.

Bismuthinite, a native sulphide of bismuth, having the formula Bi_2S_3 . It commonly occurs massive, but is also found in needle-like crystals belonging to the orthorhombic system. It is opaque, and leaden in color, often with a superficial yellowish or iridescent coating. Its hardness is 2, and its specific gravity usually about 6.5. In the United States it occurs in Connecticut, California, North Carolina, and Utah. It is also found in Mexico and Canada, and in Sweden, France, England, and Bolivia. Where it can be had in quantity, it is mined as an ore of bismuth.

Bison, a form of wild cattle regarded by some naturalists as constituting a genus *Bison*, separated from the larger group *Bos*, which is represented by the American "buffalo," the European aurochs, and some extinct species. Bisons differ from other cattle, in external appearance, mainly by their massive and shaggy forms. Their heads are exceedingly broad, and the horns curve outwardly from each side of the forehead, and are short, round, and thick. A mop of long and shaggy hair covers the forehead, nearly hiding the little eyes, and forms a great beard upon the throat and chin, especially of the bulls. In order to support this massive head, which is usually carried low, great spines rise from the vertebrae of the back over the shoulders, giving attachment to the huge muscles necessary to support the skull. This makes the neck very thick, and the fore-

BISON

quarters much higher than the haunches, which droop away from the arched contour of the back, over the withers. The massive appearance of the fore-quarters is increased by the long growth of hair on the neck, shoulders, and fore-legs, which is especially coarse and shaggy in bulls, and is of protection to them in their furious assaults upon one another in the rutting season. This hair consists mainly of a short, crisp, wool-like growth, different from that of other cattle, and capable of being woven. Internally, the bisons are peculiar in having 14 ribs, instead of 13; in the breadth and convexity of the frontal bones of the skull; in having six, instead of four nasal bones; and in the comparative slenderness of the bones of the limbs. The bisons are inhabitants of the northern hemisphere, and, in the era preceding the present, were represented by two or three species of probably circum-polar range. The race is represented in the Old World by the aurochs, now preserved only in small, protected herds in Russia (see AUROCHS); and in America, by the buffalo (*Bison americanus*), now nearly extinct.

The American bison or buffalo is somewhat smaller than the aurochs, and has shorter and thicker horns, and a shorter tail, but its hump and fore-quarters are higher, and more shaggy. The females are much inferior to the males in bulk, weighing only about 1,200 pounds, whereas an old bull in good condition will weigh 2,000 pounds. The American animal differs in one very important respect from the European species, due to the difference in their habitats. The auroch was a native of a region covered with forests, where large herds could not find open pasturage of any considerable extent, and consequently moved about only in small bands, whereas the American animal had open to it the immense, grassy prairies and plains of the interior of this continent, and was able, and in effect, forced to join into vast herds, so that it acquired gregarious habits. When North America was explored by white men, the bison was first encountered in the valleys of the Alleghanies, and scattered throughout the prairies of the Mississippi valley, north of the Tennessee River. Its principal home, however, was upon the grassy plains, between the Missouri River and the Rocky Mountains, where the herds sometimes contained hundreds of thousands of individuals, and grazed all the way from southern Texas to the shores of Great Slave Lake. They wandered through the valleys of the Rocky Mountains, to the plains of New Mexico, Utah, and Idaho, but seemed never to have crossed the Sierra Nevada. Those east of the Mississippi River were probably killed off before the beginning of the 19th century, and by 1850 none remained east of the dry plains. The building of the Union P. and Kansas P. R.R.'s, where the early trains were sometimes stopped by herds crossing the tracks, soon led to the disappearance of the animals from the central plains; and by 1875 they were divided into two distinct groups, a northern and a southern. These were rapidly slaughtered by parties of men who followed the animals at all seasons, and killed them for their hides, which, as "buffalo robes" became more and more valuable, until by 1890 the Texan herd had been utterly exterminated, and of the northern herd, none remained except such as had been gathered by

the government for preservation in Yellowstone Park, and a few hundred that still survive in the remote forests beyond the North Saskatchewan. The herd in Yellowstone Park amounts to about 100 and will probably be maintained under the protection of law. Small bands are living in private parks and zoological gardens in various parts of the world. Thus, perhaps, 500 or 600 living bisons remain as the sole relic of the millions of these valuable animals, which half a century ago ranged our western plains, and which were recklessly wasted.

The buffalo herds were made up of small companies, consisting of a patriarchal old bull, several cows, and a number of young of various ages, and thousands of these companies would graze in the same region, all moving slowly in the same direction, so that travelers would never be out of sight of bisons during a whole day's journey. They were more or less nomadic, wandering from one part of the plains to the other in search of fresh pasturage. Thus on the approach of winter a general movement always took place from the high, central plains toward the warmer south, and also into the shelter of the wooded valleys of the foot-hills. In these journeys they had the habit of traveling in single file, thus forming long, narrow paths, which the plainsmen called "buffalo trails," yet traceable in many places. In spite of their weight and apparent clumsiness, they swam rivers with ease, and climbed about the mountains with remarkable agility. Nevertheless they chose the easiest places, and the well-marked buffalo-trails were the guides for explorers, and were most deeply imprinted in those mountain passes, which are now the highways of commerce. The sexes kept together throughout the year, and as is usual among gregarious animals, there was constant fighting among the bulls for the supremacy of their bands, the old leaders being overthrown by younger and more vigorous aspirants, as soon as their strength began to wane. Thus the very best sires were continually selected by the law of battle, and the race kept at its highest point. The herding was a measure of protection against the enemies which hung upon the skirts of every band. The grizzly bear was perhaps the only animal that could vanquish a bison bull in fair fight, but pumas and wolves were ever on the watch to seize any young or feeble ones that strayed from the band. When attacked the band would instantly form a close crowd with the cows and calves in the centre, protected by the bulls, forming a circle with lowered heads on the outside. The calves were born in the spring, a single one, as a rule, to each cow after a gestation of about nine months.

To the western Indians the bison was the principal resource for food and shelter, and was continually hunted. In the days before firearms, the Indians would approach them on foot, by creeping within bowshot on all fours, often disguised in the skin of a calf or an antelope; or would rush the herds upon horseback. They also had the practice in rough countries of driving the buffaloes into enclosures or small canyons, where they could easily be slaughtered; or sometimes would force them over a cliff, to be killed by the fall. Besides eating the flesh as fresh meat, vast quantities of it would be cut into strips each autumn, and dried in the sun for winter use; while the northern tribes

chopped it into fine pieces, mixed it with berries, and preserved it in skin bags, mixed with boiled fat, and so formed the highly portable and nutritious food called "pemmican." The disappearance of the buffalo consequently meant starvation to the Indians, as well as the loss of the principal material for warm clothing and bedding, and the Indian wars which raged upon the plains, during the third quarter of the 19th century, were mainly due to the desperate efforts made by these people, to preserve their hunting-grounds.

Species of fossil bisons have been found both in Europe and America, associated with the remains of mammoths, mastodons, and other extinct animals of the Quaternary Period. Some of these extinct bisons exceeded in size any of the living species, the bony horn-cores in one being six feet from tip to tip (the length of the horns themselves must have been considerably greater); the height of this species is estimated to have been over six feet at the shoulder.

The literature relating to the American buffalo is as extensive as the story of the western States. The most complete and special accounts are J. A. Allen's monograph, 'The American Bisons' republished by the United States Geological Survey in 1875; and W. T. Hornaday's 'Extirmination of the American Bison,' in the annual report of the Smithsonian Institution for 1887. For the more picturesque and adventurous side of the animal's history, and its hunting, consult Audubon's 'Quadrupeds of America'; Catlin's 'North American Indians'; Gregg's 'Commerce of the Prairies'; Dodge's 'Black Hills'; Butler's 'Great Lone Land'; and the accounts of western explorations by such writers as Pike, Fremont, Marcy, Long, Emory, and Stansbury.

Bispham, bîs'pām, **David S.**, baritone singer b Philadelphia, Pa, 5 Jan. 1857, of Quaker parentage. Educated at Haverford College, Pennsylvania, he later studied music and singing in England and Italy. His début was made as the Duc de Lonqueville in 'The Baisoché,' London, in 1891, and since then he has been the principal baritone of the Royal Opera Company, Covent Garden, London, occasionally visiting the United States on an operatic tour. An accomplished linguist, he is equally at home in German, French, or Italian, but his greatest successes have been in Wagnerian roles, such as 'Alberich' and 'Wolfram.'

Bissagos, bîs-sā'gōz, a group of islands, about 20 in number, near the west coast of Africa, opposite the mouth of the Rio Grande, between lat. 10° and 12° N, belonging, like the mainland opposite, to Portugal. The largest, Orango, is about 25 miles in length, and most of them are inhabited by a rude negro race. The inhabitants cultivate maize, bananas, and palms, but their chief employment is in fishing. Most of the islands are under native chiefs, who are nominally vassals of Portugal. At Bolama, or Bulama, once a British settlement, but abandoned in 1793, there is a thriving Portuguese town, which is the seat of government.

Bissão, bes-sā'o, an island and Portuguese station closer to the African coast than the Bissagos and opposite the Jeba's delta. Before the prohibition of slavery by the Portuguese government it was an important slave market.

Bissell, Edwin Cone, American biblical scholar: b. Scobarie, N. Y., 2 March 1832; d. Chicago, 9 April 1894. He prepared for the ministry at Union Theological Seminary, N. Y., and held Congregational pastorates at West-hampton, Mass., San Francisco, Cal., and Winchester, Mass., and was professor of Hebrew in the Hartford Theological Seminary, 1881-92, and at the McCormick Presbyterian Seminary, Chicago, 1892-4. He published: 'The Historic Origin of the Bible' (1873); 'The Pentateuch: Its Origin and Structure' (1885); 'Biblical Antiquities' (1888); 'Genesis Printed in Colors, Showing the Original Sources from which it is Supposed to Have Been Compiled' (1892); 'The Apocrypha of the Old Testament, with Historical Introductions,' his greatest work (1880).

Bissell, William Henry Augustus, American prelate of the Episcopal Church. b Randolph, Vt., 10 Nov. 1814; d. Burlington, Vt., 14 May 1893. Entering the Episcopal ministry in 1839, he was successively rector at West Troy, Lyons, and Geneva, N. Y., and 3 June 1868 was consecrated second bishop of the diocese of Vermont.

Bissell, Wilson Shannon, American lawyer: b. New London, N. Y., 31 Dec. 1847; d. Buffalo, 6 Oct. 1903. He graduated at Yale University in 1869; and studied law in Buffalo with Lansing, Cleveland & Folsom. In 1872 he formed a partnership with Lyman K. Bass, the firm of which Grover Cleveland became a member in 1873. When Mr. Cleveland was elected governor of New York the firm was dissolved. Subsequently it was reorganized, and in 1900 consisted of Bissell, Carey & Cooke. He has been a delegate to several State conventions; in 1884 was a Democratic presidential elector; and in 1893-5, during Mr. Cleveland's second term as President, was postmaster-general of the United States.

Bissen, Hermann Wilhelm, bîs'sën, hër'-man vil'hëlm, Danish sculptor: b. Schleswig, 1798; d. Copenhagen, 10 March 1868. From 1823 to 1833 he studied in Rome under Thorwaldsen, who, in his will, commissioned him to complete his unfinished works. In 1850 he was made director of the Academy of Arts, Copenhagen. Among his masterpieces are the 'Val-kyrie,' 'Cupid Sharpening His Arrow,' and 'Moses'; his 'Orestes,' and a frieze 134 feet long, perished in the burning of the Christian-borg at Copenhagen (1884).

Bissex'tile, the ancient name of leap year, so called from the sixth day before the calends of March being repeated or taken twice. See CALENDAR.

Bisson, Alexandre, be-sôn, ä-lëks-andr, French dramatist and musical composer: b. 1848. His vaudeville, 'Four Cuts with a Pen-knife,' won for him instant celebrity. 'The Deputy from Bombignac' is his masterpiece. Other comedies or operettas were: 'The Late Toupinel'; 'The Joys of Paternity'; 'The Pont-Biquet Family'. With Théodore de La-jarte he was joint author of a 'Grammar of Music' and of a 'Little Encyclopædia of Music.'

Bistineau, bîs-te-nō', a lake in northwest-ern Louisiana, dividing Bossier and Bienville parishes, about 30 miles in length from north to south and 2 in breadth. It receives the Dauchite

BISTORT — BITTER-SWEET

River from the north, and communicates with Red River by an outlet at its southern extremity. It is navigable for steamboats.

Bis'tort (*Polygonum Bistorta*), a perennial plant of the buckwheat family, and from its astringent properties (it contains much tannin) sometimes used medicinally. It bears a raceme of flesh-colored flowers. It is also called adder's-wort and snake-weed, from being a supposed remedy against snake bites. The American representative is a naturalized plant (*P. viviparum*), found on Alpine summits of New England and on the shores of Lake Superior and northward. It bears an erect spike of flesh-colored flowers.

Bistre, bis'tér, a reddish brown water-color, generally obtained from the soot that collects in chimney-flues. This is pulverized and washed to remove the saline ingredients. The finest sediment is then dissolved in vinegar, to which gum-water is afterward added. It was formerly much used for making painters' crayons, and also for a paint in water-color designs. Sepia, however, is now preferred to it, as it has a more agreeable color and is more easily employed.

Bithur, be-thoor', India, a town 12 miles northwest of Cawnpore, on the right bank of the Ganges. In the Indian mutiny it had some notoriety conferred on it from being the residence of Nana Sahib, also styled the rajah of Bithoor. The town was long the abode of a line of Mahratta chiefs, the last of whom died without issue in 1851. His adopted son, Nana Sahib, whose proper name, however, was Dhundoo Punt, claimed the succession, but his title was ignored by the East India Company, a proceeding which is believed to have stimulated him to his subsequent deeds of atrocity. Gen. Havelock gained a brilliant victory over the rebels in the vicinity, and subsequently quantities of treasure belonging to the Nana were discovered by the troops in a well close to the palace. Pop. 7,000.

Bithyn'ia, anciently a country in Asia Minor, on the Black Sea, the Bosphorus, and the Sea of Marmora, and bounded on the south by Phrygia. In early times it was called Bebrycia, from the Bebrycians who inhabited it. Before the time of Cræsus, Bithynia was an independent state, under its own princes. After the death of Prusias I., in the war against Cræsus, it fell into the power of the Lydians, 560 B.C.; into that of the Persians, 555 B.C.; and into that of Alexander, 334 B.C. The restorer of the Bithynian throne was Bias or Bas, a native prince, at the court of one of whose successors, Prusias II., Hannibal took refuge, and where he ended his life by poison, 183 B.C. Nicomedes, the last king of this race, bequeathed his kingdom to the Romans, 75 B.C. The famous cities of Nicomedia, Nicæa, and Heraclea were in Bithynia. In the 11th century Bithynia was conquered by the Seljuks. In 1208 a new kingdom was founded there by the Ottoman Turks, of which, in 1327, Prusa was the capital. See Ramsay, 'Historical Geography of Asia Minor' (1890).

Biting-lice. See BIRD-LICE.

Biton, bi'ton, Greek mathematician, of uncertain date, but supposed to have been a contemporary of Archimedes, wrote a work of some

interest on warlike engines, and dedicated it to Attalus, king of Pergamos. It is to be found in the 'Mathematici Veteres' of Thevenot.

Bitter, Arthur, pseudonym of SAMUEL HABERSTICH, Swiss poet and story writer: b. Ried, near Schlosswyl, 21 Oct. 1821; d. Bern, 20 Feb. 1872. Novelettes, stories, and poems proceeded from his pen for many years, all characterized by sympathy of tone and inoffensive realism, 'Tales, Romances, and Poems' (1865-6), being most pleasing.

Bitter, Karl Theodore Francis, Austro-American sculptor: b. Vienna, Austria, 6 Dec. 1867. He came to the United States in 1889 and soon acquired world-wide reputation. He executed the sculpture on the main buildings of the World's Columbian Exposition, and on the residences of Cornelius Vanderbilt, C. P. Huntington and others in New York. He was appointed director of sculpture at the Pan-American Exposition at Buffalo, and the Louisiana Purchase Exposition at Saint Louis.

Bitter Almonds. In medicine the oil of bitter almonds, containing prussic acid, is used as a gastric sedative and as an antispasmodic. See PRUSSIC ACID.

Bitter Ash, the quassia tree. See QUASSIA.

Bitter-root, *Lewisia rediviva*, a plant of Canada and part of the United States, order *Portulacaceæ*, so called from its root being bitter though edible, and indeed esteemed as an article of food by whites as well as Indians. From the root, which is long, fleshy, and tapering, grow clusters of succulent green leaves, with a fleshy stalk bearing a solitary rose-colored flower rising in the centre, and remaining open only in sunshine. Flower and leaves together, the plant appears above ground for only about six weeks. California bitter-root (*Echinocystis fabacea*) and Natal bitter-root (*Gerardanthus macrorrhiza*) both belong to the gourd family.

Bitter Root Mountains, a range of the Rocky Mountains, in Montana, deriving its name from a plant with rose-colored blossoms, whose slender roots are used by the Indians for winter food. The chief summits are Lolo Peak and St. Mary's Peak.

Bitter Root River, a tributary of the Columbia in Montana, flowing north into Clark's River in Missoula County; length about 110 miles. Gold has been found in this region.

Bitter Root Valley, a valley on the east of the Bitter Root range, in Montana, 90 miles long and 7 miles wide, enwalled by lofty mountains, and abounding in farms and cornfields.

Bitter Spar, rhomb-spar, the crystallized form of dolomite or magnesian limestone. The name is derived from the magnesia contained in it, the taste of salts of magnesia being bitter.

Bitter-sweet, *Dulcamara*, or **Woody Nightshade**, *Solanum Dulcamara*, a sprawling vine of the natural order *Solanaceæ*, native of Europe and Asia, and introduced into the United States. It has purplish or blue flowers arranged in cymes which are succeeded by attractive inedible berries. The leaves have been used medicinally in the form of an extract. The name, properly false bitter-sweet, is given to *Celastrus scandens*, a handsome climber of the natural order *Celastraceæ* found from eastern Canada to South Dakota and southward to New Mexico.

BITTER-SWEET—BITUMEN PROCESS

It often grows 20 feet tall and is perhaps most attractive on account of its orange-yellow fruits which split open and expose the crimson seeds. Both seeds and fruits remain attached to the plants during the winter.

Bitter-Sweet, a once popular narrative didactic poem by J. G. Holland, published 1858. It contains about 3,500 lines, and is descriptive of New England rural life.

Bitter Vetch, a name applied to two kinds of leguminous plants: (1) *Ervum ervilia*, a lentil cultivated for fodder; and (2) all the species of *Orobis*, for example, the common bitter vetch *O. tuberosus*, a perennial herbaceous plant with racemes of purple flowers and sweet edible tubers.

Bittern, a bird of the heron family and genus *Botaurus*, several species of which exist in various parts of the world. The bitterns differ from the herons in their lesser size, shorter neck, comparative shortness of the legs, and superior length of toes, and in their nocturnal habits and loud voices. Otherwise their haunts, food, and manner of life closely resemble those of herons (q.v.). The only North American species is the common bittern (*B. lentiginosus*), which is spread throughout the United States and southern Canada in all suitable places, often close to towns. Its length is about 25 inches, and the plumage is tawny brown of various shades, excessively variegated everywhere, the neck is striped with dull yellow and has on each side a dark patch. Both sexes, and the young, are alike in plumage. The Old World species (*B. stellaris*) is very similar, but has more red on the upper parts, and green about the head. It is found numerously from Ireland to Japan, in India and throughout all Africa. Other species or varieties spread the range of the genus to New Zealand and the South Sea Islands. The one great peculiarity of the bitterns, to which they owe their Latin and many local names, is their extraordinary vocal utterance in spring, which in the European species is likened to booming by everyone who has heard it, and has been called "a loud and awful voice." The old fable that this sound was produced in some mysterious way by the bird while it held its beak plunged into the mud is untrue; and the flesh is no longer esteemed as a dainty, as it was some centuries ago. The voice of the American bittern is a droning, thumping noise, which has been likened to the driving of a stake with an axe, or, more often, to the working of an old-fashioned pump-handle. Hence the rural names, "stake-driver," "mire-drum," "bog-pumper," "thunder-pump," and the like. Nuttall attempted to suggest the sound of the syllables "pump-au-gah"; but Samuels succeeds better. He writes: "In the mating season, and during the first part of the period of incubation, the male has a peculiar love-note, that almost exactly resembles the stroke of a mallet on a stake; something like the syllables 'chunk-a-lunk-chunk, quank-chunk-a-lunk-chunk.' I have often, when in the forests of northern Maine, been deceived by this note into believing that some woodman or settler was in my neighborhood, and discovered my mistake only after toiling through swamp and morass for perhaps half a mile."

A genus of smaller birds, *Ardetta*, is known as that of the "least bitterns." One species (*A.*

exilis) occurs over most of North America, and related species belong to South America. They are intermediate between the true bitterns and the night-herons.

Consult Cones, 'Birds of the Northwest' (1874); and Newton, 'Dictionary of Birds' (1896), and the other authorities therein cited.

Bittern, or **Salt Oil**, the name given to the syrupy residue from evaporated sea-water after the common salt has been taken out of it. The syrup contains salts of magnesium, which give it a bitter taste, and it is employed as a source of them. It is also one of the sources of bromine. Bittern procured from the salt works at Epsom, England, was formerly the source of sulphate of magnesium, hence styled Epsom salts. See SALT.

Bitternut. See HICKORY.

Bitters, a class of compounds largely employed as appetizers and digestants. They are for the most part alcoholic drinks to which some plant containing a bitter principle is added. The bitter principles are either alkaloids, as in the quinine of calisaya, or amaroids, which are widely distributed in plants. The most commonly employed bitters are quassia, gentian, angostura, cascarrilla, wild cherry, and cinchona. Medicinally bitters are classed as simple and aromatic, the latter containing volatile oils in addition to the bitter principles. The simple bitters mostly used are quassia, gentian, and calumbia. The aromatic bitters are cascarrilla, eupatorium (boneset), angostura, serpentaria, and chamomile.

Bitterwood, various trees and shrubs of the genus *Xylopia* of the natural order *Simarubaceae*, noted for the bitterness of their wood which is used for furniture because of its resistance to insects. One Brazilian species (*X. sericea*) furnishes a peppery fruit and a cordage fibre. The name bitterwood is also given to *Picramnia excelsa* (*Quassia excelsa* of some botanists) belonging to the natural order *Simarubaceae*. This tree is a native of the West Indies and is used like quassia (q.v.).

Bittinger, **Lucy Forney**, American historical writer. b. Cleveland, Ohio, 29 Aug. 1859. She has published 'Memorials of Rev. J. B. Bittinger' (1891); 'History of the Forney Family of Hanover, Pennsylvania' (1893); and 'The Germans in Colonial Times,' (1901), a work of much value.

Bitumen, a general term, perhaps first used by Pliny, and including various native hydrocarbons, such as petroleum, asphaltum, elaterite, and grahamite. The bitumens are probably all of vegetable origin, and while not confined to any particular geological formation, they occur most abundantly at or near the earth's surface, often in connection with rocks containing organic remains.

Bitumen Process, the first known method of fixing the image of the camera, so as to make it permanent. The blackening action of light upon salts of silver was known in the 18th century, but no method was known for fixing the image obtained with salts of silver until about 1838. The bitumen process was perfected in 1827 by a Frenchman, Nicéphore de Niépce. He coated plates of metal with a solution of asphaltum in oil of lavender, and then, after drying them, he exposed them for a pro-

BITUMINOUS COAL — BIVALVES

digious length of time in a camera. A very faint image was the result. The plate was subsequently immersed in a developer consisting of one part of oil of lavender and 10 parts of petroleum, which slowly dissolved the parts unaffected by light, leaving a permanent picture formed of those parts of the asphaltum that the light had rendered insoluble. Subsequently Daguerre became associated with Niépce, and together they improved the bitumen process until Daguerre said that "the time required to procure a photographic copy of a landscape is from seven to eight hours; but single monuments, when strongly lighted by the sun, or which are themselves very bright, can be taken in about three hours." See CAMERA; PHOTOGRAPHY.

Bitu'minous Coal. See COAL.

Bituminous Limestone, a limestone impregnated with asphaltum or mineral pitch. Petroleum grades insensibly into maltha, and this in turn into asphalt or solid bitumen. The term bituminous limestone is therefore applied to almost any limestone carrying hydrocarbon compounds having an asphaltic base, as distinguished from the paraffine base of many petroleum. Bituminous limestone is found at many localities in the United States, particularly in Indian Territory, California, and Arkansas. Its chief commercial use is as a paving material, but it also serves as a source of asphaltic products.

Bivalves, those mollusks of the class *Pelecypoda* (qv) whose coverings consist of two concave shell plates or valves.

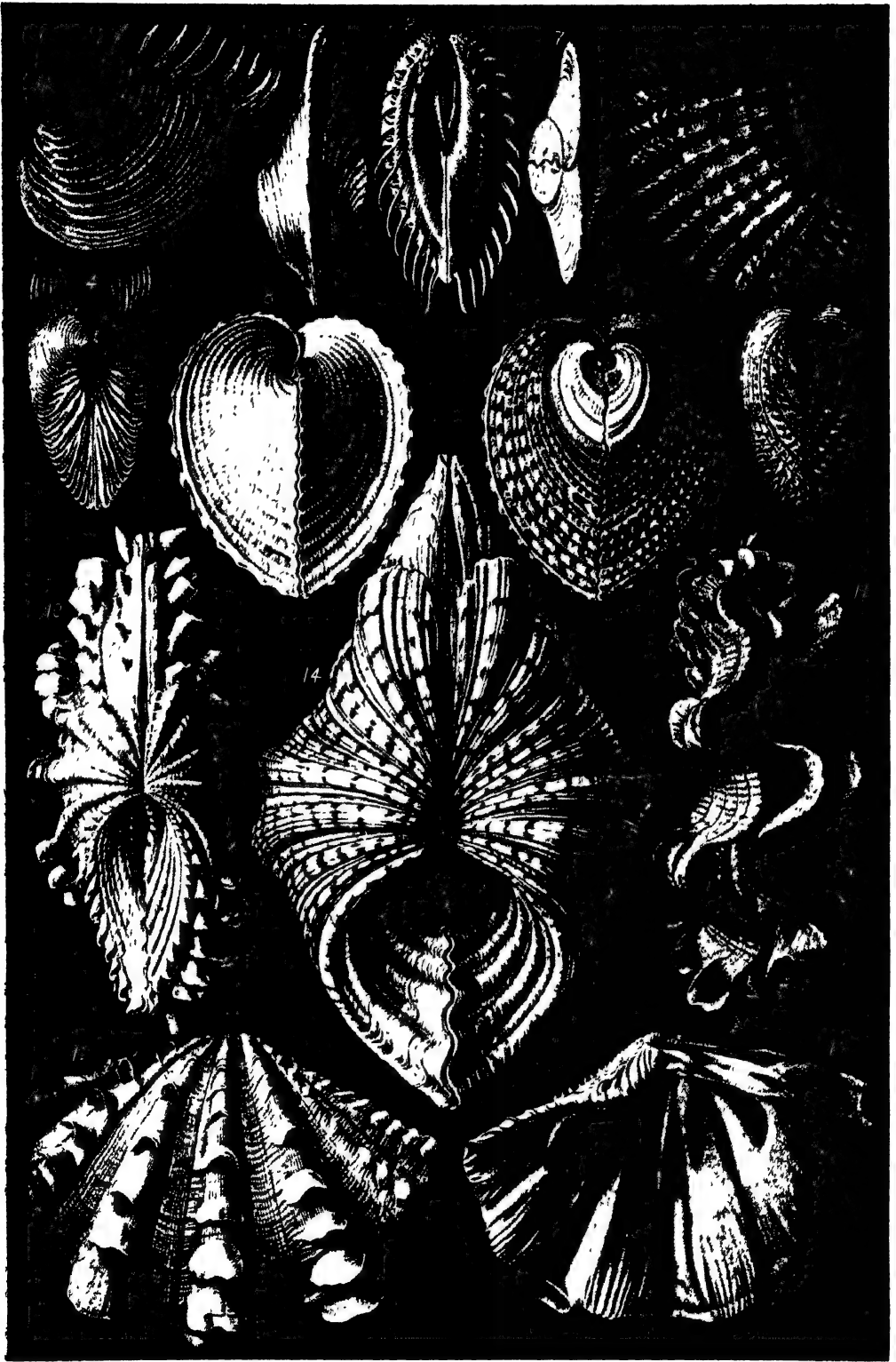
Bivalves, (for example, the clam) are entirely protected by the valves, which are connected by a hinge, consisting of a large tooth or teeth (usually three), and a ligament. In the clam both valves are alike, in the scallop the hinge margin is eared, and the shell is marked with radiating ridges, while in most bivalves there are simple lines of growth. On the interior, which is usually lined with mother-of-pearl, are either one (in oysters and scallops) or two (clams, etc.) roundish muscular impressions made by the single or the two adductor muscles by which the valves are closed. The shell is often covered by an epidermis. The hinge is situated directly over the heart, and is therefore dorsal or "hæmal." The shell is secreted by the thickened edge of the mantle or body-walls. There is in bivalves in distinction from snails (*Gastropoda*) no head, and the mouth is not armed with teeth or a lingual ribbon, present in snails. The mouth is small with soft lips, and in each side is a pair of labial palpi. The short œsophagus opens into a small stomach which receives the contents of the liver. The long intestine is coiled in the visceral mass, the solid disk-like portion of the body in the clam and oyster, the intestine also passes through the ventricle of the heart, and then ends opposite the upper division of the siphon. This heart is three-chambered, consisting of a ventricle and two auricles. The siphon forms the so-called head of the clam, though it is situated at the posterior end of the body; it forms a double tube, ending in an excurrent and incurrent orifice surrounded by a circle of tentacles which are sensitive to the touch. The siphon is very long in the clam (*Mya*) and other bivalves which burrow in the sand or mud and live in deep holes. Locomotion is effected by the

so-called "foot," which is a wedge-shaped or hatchet-shaped fleshy tongue-like mass situated at the front end under the mouth. Its hatchet-shape gives the name *Pelecypoda* to the class. This foot is enormous in the razor-fish, which burrows with extreme rapidity in the sand. In fixed bivalves, such as the oyster and mussel, the foot and siphon are reduced by atrophy or are entirely wanting. There being no head, there are usually no eyes, except in the scallops, where they are numerous, large, and situated on the thickened edge of the mantle. Bivalves breathe by one pair, more usually two pairs, of leaf-like gills; situated on each side of the visceral mass. The individuals are bisexual, each being male or female. The nervous system consists of three pairs of ganglia, connected by a nerve-thread. The supræesophageal ganglia is the so-called "brain," being situated over the mouth; the pedal ganglion is in the centre of the foot, while the visceral ganglion is near the middle of the body. Most bivalves possess an organ of hearing or of equilibration, a very minute otocyst situated in the centre of the foot, and connected by a nerve with the pedal ganglion. The ovaries are yellowish, voluminous glands forming the larger part of the visceral mass. These mollusks are very prolific, the oyster laying about 2,000,000 eggs.

In the oyster (*Ostrea*) or in *Anomia* the shell is inequilateral, one valve, usually the left and lower one, being fixed to some object, and the intestine does not pass through the ventricle; in *Arca* the ventricle is double. In *Lucina* and *Corbis* there is but one gill on each side, and in *Pecten*, *Spondylus*, and *Trigona* the gills are reduced to comb-like processes. Contrary to the habits of most bivalves, the scallop can skip over the surface of the water by violently opening and shutting its shell. *Trigona* is also capable of leaping a short distance, while *Lima* is an active flyer or leaper. The American oyster is dioecious, while most mollusks are monœcious or hermaphroditic. The foot varies much in form; in the mussel, *Pinna*, *Cyclocardia*, and the pearl-oyster it is finger-shaped and grooved, with a gland for secreting a bundle of threads, the *byssus*, by means of which it is anchored to the bottom. The foot in the quohog, *Neuhnia* and *Chidiophora*, is large, these mollusks being very active in their movements. In *Glycymeris* the fringe is toothless, much as in the oyster. In *Macra* the middle tooth of the hinge is large, the corresponding cavity large and triangular. In *Saxicava* and *Panopæa*, the pallial line is represented by a row of dots. In *Macoma* the siphons are very long.

Lithodomus, the date-shell, one of the mussels, bores into corals, oyster shells, etc.: the common *Saxicava* excavates holes in mud and soft limestone, as does *Gastrochæna*, *Pholas*, and *Petricola*. Certain boring lamellibranchs, such as *Pholas*, are luminous.

A very aberrant form of bivalve mollusk is *Clavagella*, in which the shell is oblong, with flat valves, the left cemented to the sides of a deep burrow. The tube is cylindrical, fringed above, and ending below in a disk, with a minute central fissure, and bordered with branching tubules. In *Aspergillum*, the watering-pot shell, the small bivalve shell is cemented to the lower end of a long shelly tube, closed below by a perforated disk like the nose of a watering-pot.



BIVALVE MOLLUSCA.

1-3 *Cytherea dione*.

4, 5 *Cardium aculeatum*.

6-9 *Hemlicardium cardissa*.

10-13 *Tridacna squamosa*.

14 *Hippopus maculatus*.

Bivalves, in growing, pass through a pre-swimming larval stage called a "trochosphere," resembling a top, and moved by a circlet or zone of cilia. After a while two flaps (*vela*) arise on each side of the mouth, forming the *veggliger* stage; meanwhile the shells arise, and as they become larger and heavier, the young bivalve sinks to the bottom, and begins to use its "foot" for burrowing.

Some bivalves arrive at maturity in a single year. The fresh-water mussels live from 10 to 12 years, while the giant clam (*Tridacna gigantea*) probably lives from sixty years to a century.

The bivalves began to appear in the Cambrian Period; they became more frequent in the Ordovician and Silurian, but they did not abound until toward the Mesozoic Age, since the seas during the Palæozoic Age were crowded with brachiopods (qv). Oysters date from the beginning of the Mesozoic. The genus *Mucula* and its allies are very primitive forms, and nearly allied to the earliest known bivalves. Of about 15,000 known species of bivalves, two thirds (10,000) are fossil.

The class *Pelecypoda* (or *Lamellibranchiata*) is divided by the gill characters (see Parker and Haswell's Zoology) into five orders, namely: (1) *Protobranchia*, (2) *Filibranchia*, (3) *Pseudo-lamellibranchia*, (4) *Eulamellibranchia*, (5) *Septibranchia*, and by Dall, from the hinge-characters, into three ordinal groups *Prionodermacea*, *Anomalodermacea*, and *Telodermacea*. In Neumayr's group *Palæoconcha*, now forming a part of the *Prionodermacea*, are included certain primitive types which appear to have given origin to certain more modern groups. For further information and the literature of the subject see MOLLUSCA.

Bixby, James Thompson, American author and clergyman. b Barre, Mass., 30 July 1843. He graduated at Harvard in 1864, and became a Unitarian minister. He has published: 'Similarities of Physical and Religious Knowledge' (1876), 'The Crisis in Morals' (1891); 'Religion and Science as Allies' (1895); 'Ethics of Evolution' (1900); 'The New World and the New Thought' (1902).

Bizet, Alexander Cesar Leopold, be-zā, a-lēks-andr sā-zar lā-ō-pöld (better known as GEORGE BIZET), French composer. b Paris, 25 Oct. 1838, d there, 3 June 1875. He studied with Halévy, whose daughter he married, and at the Paris Conservatory. His operas include: 'The Pearl Fishers' (1863), 'The Fair Maid of Perth' (1867); 'Djamileh' (1872); and 'Carmen' (1875), his most famous composition, which retains all its early popularity and is founded on Mérimée's novel of that name.

Bjerregaard, byēr-re-gard, Carl Henry Andrew, Danish-American writer. b Fredrica, Denmark, 24 May 1845. He served five years in the Danish army, and came to America in 1873. He has been librarian of the Astor Library, New York, from 1879, and has written: 'Mysticism and Nature Worship'; 'Being and the Philosophical History of the Subject'.

Björnson, Björnstjerne, byēr'n'sōn, byēr'n-she-rng, Norwegian novelist, poet, and dramatist: b Kvikne, 8 Dec. 1832. He entered the

University of Christiania in 1852, and he speedily became known as a contributor of articles and stories to newspapers and as a dramatic critic. From 1857 to 1859 he was manager of the Bergen theatre, producing during that time his novel, 'Arne' (1858), and his tragedy of 'Halte Hulda'. He was at Christiania part editor of the *Aftenblad* in 1860, then lived several years abroad, and in 1866 became editor of the 'Norsk Folkeblad'. In 1869-72 he was co-director of a Copenhagen periodical, and much of his later life has been passed abroad. The democratic tendencies to be found in his novels have found a practical outcome in the active part taken by him in political questions bearing upon the Norwegian peasantry and popular representation. He has been for a long period the leader of the Norwegian republicans, and the national entity symbolized by the change made in the Norwegian flag on 1 Jan. 1901 is more nearly due to him than to any one else. He is the greatest distinctively Norwegian writer of his day, and his popularity among his countrymen is very great. In 1880-1 he traveled and lectured in the United States. His dramas include: 'Sigurd Jorsalfar' (1872); 'Mary Stuart in Scotland' (1864); 'The Newly Wedded Pair' (1866); 'Sigurd Slembe' (1872); 'The Editor' (1874); 'A Bankruptcy' (1875); 'The King' (1877); 'Leonarda' (1879); 'The New System' (1879); 'A Glove' (1883); 'Beyond Our Strength' (1883); 'Geography and Love' (1885). His verse includes: 'Poems and Songs' (1870); 'Arnlot Gyllene,' an epic (1870). Besides the pastoral tales: 'Arne' (1858); 'A Happy Boy' (1860); 'The Fisher Maiden' (1868); 'Synnøve Solbakken,' he has written the novels: 'The Bridal March' (1873); 'Magnhild' (1877); 'Captain Mansana' (1879); 'The Heritage of the Kurts' (1884); 'In God's Way' (1889); 'Absalom's Hair'; etc. See Boyesen, 'Essays on Scandinavian Literature' (1895); Gosse, 'An Essay on the Writings of Björnson' (1895); Brandes, 'Moderne Geister' (1897).

Bjornstjerna, byēr'n'shēr - na, Magnus Frederick Ferdinand, mag-noos frēd'er-ik fēr-de-nand (COUNT), Swedish statesman and author: b. Dresden, 10 Oct. 1779; d. Stockholm, 6 Oct. 1847. He was educated in Germany, and in 1793 proceeded to Sweden to enter the army. At the storming of Dessau he received a severe contusion from a cannon-ball, but he was able, notwithstanding, to be present at the battle of Leipsic. He afterward concluded the capitulation of Lubeck with Gen. Lallemand, and received the surrender of the fortress of Maestricht. He concluded with Prince Christian Frederick at Moss the convention which was followed by the union of Norway and Sweden. He published 'The British Rule in the East Indies' and 'Theogony, Philosophy, and Cosmogony of the Hindoos' (1843).

Blacas, Pierre Louis Jean Casimir, blā-ka, pe-ār loo-e zhōn (Duc DE), French statesman: b Aups, Var, 12 Jan. 1771; d Kirchburg, Austria, 17 Nov. 1839. He was cabinet minister in the time of Louis XVIII, and a confidential adviser of the Bourbons; twice minister to Naples; ambassador to Rome to negotiate the concordat of 1817; went into exile upon the banishment of Charles X; and offered the king his fortune, which was not accepted. He was so

BLACK

faithful to the Bourbons as to be unpopular with the people. He was a large collector of antiquities and founded the Egyptian Museum at Paris

Black, Adam, Scotch publisher: b Edinburgh, 20 Feb 1784; d there, 24 Jan 1874. In 1808 he began business as a bookseller, and later with his nephew, Charles B. Black, established a publishing house in Edinburgh. Their most famous publications were: 'Encyclopædia Britannica,' and the 'Waverley Novels'. Adam Black was twice lord provost of Edinburgh, and in 1856-65 represented that city in Parliament. He declined the honor of knighthood, and a statue was erected in Edinburgh in recognition of his public services in 1877.

Black, Alexander, American author: b New York, 7 Feb 1859. He has published 'The Story of Ohio' (1888); 'Photography Indoors and Out' (1894); 'Miss Jerry' (1895); 'A Capital Courtship' (1897); 'Miss America' (1898); 'Modern Daughters' (1899); 'The Girl and the Guardsman' (1900).

Black, Charles Clarke, American lawyer: b Mount Holly, N J, 29 July 1858. He studied law and was admitted to the New Jersey bar in 1881. He has since practised in Jersey City, and has published 'Proof and Pleadings in Accident Cases' (1886); 'New Jersey Law of Taxation' (1893); 'Law and Practice in Accident Cases' (1900).

Black, Frank Swett, American lawyer: b. Limington, Me., 8 March 1853. He graduated at Dartmouth College in 1875; was editor of the *Journal* in Johnstown, N Y; studied law at Troy in the office of Robertson & Foster, and was admitted to the bar in 1879. He won much popularity by his activity in prosecuting the men who murdered Robert Ross in the election riots in Troy in 1892. In 1895-7, he was a member of Congress, and in 1897-9 governor of New York.

Black, James, American prohibitionist: b Lewisburg, Pa., 23 Sept 1823; d 16 Dec 1893. He joined a temperance society at the age of 17, and throughout his life was a determined advocate of prohibition and legislation for its enforcement. He was the first to propose the formation of a temperance party, was one of the committee that called a national convention to organize the Prohibition party (q.v.) and was elected its president when the convention met in Chicago, 1 Sept. 1869. At the Columbus, Ohio, convention, 22 Feb. 1872, he was made the first nominee of the party for President of the United States. His ticket received 5,608 votes in the election of that year. He published 'Is There a Necessity for a Prohibition Party?' (1876); 'History of the Prohibition Party' (1880); 'The Prohibition Party' (1885).

Black, Jeremiah Sullivan, American jurist and statesman: b Glades, Somerset county, Pa., 10 Jan 1810; d York, Pa., 19 Aug 1883. At 17 years of age he entered the law office of Chauncey Forward, in Somerset, an eminent member of the bar, and was admitted to the courts in 1830, being still in his minority. In April, 1842, he was appointed by the governor president judge of the judicial district in which he resided, and confirmed by the Senate upon a strict party vote. In 1851, when a change in the

State Constitution made the judges elective, he was nominated as judge of the Supreme Court by the Democratic convention, before which he was not a candidate. Of the 10 candidates named by the two parties, he obtained the largest popular vote. Under the mode of drawing provided by the Constitution, a three years' term was assigned to him, and he became chief justice of the court. In 1854 he was re-elected to this place, by a majority of 47,000 votes, though the candidate for Governor on the same ticket was defeated by 37,000. On 5 March 1857, while engaged in the discharge of his judicial duties at Philadelphia, he received a telegraphic despatch from President Buchanan, tendering him the appointment of Attorney-General of the United States. He soon after appeared on behalf of the government, in a disputed land claim from California, involving an important principle upon which hundreds of similar cases depended. He achieved a great success, at once becoming famous as a jurist.

In December, 1860, Mr Black succeeded Mr. Cass as Secretary of State. After the election of Lincoln, Judge Black retired to his law practice. In 1868, he was counsel for President Johnson in the famous impeachment trial. In 1877 he appeared as counsel for S J Tilden before the Electoral Commission. Besides a great jurist, Judge Black was a brilliant conversationalist, classical scholar, and powerful orator. His collected 'Essays and Speeches' were published in 1885.

Black, John Charles, American lawyer, soldier, and statesman: b Lexington, Miss., 27 Jan 1839. He entered the Union army in 1861 as colonel of the 37th Illinois Volunteers; was severely wounded in the service; and was brevetted brigadier-general. After the war he was elected Congressman-at-large from Illinois; was appointed commissioner of pensions by President Cleveland during the latter's first term, and United States attorney for the northern district of Illinois during his second term.

Black, Joseph, Scottish chemist: b. Bordeaux, France, 1728; d Edinburgh, 6 Dec 1799. He studied medicine, and in 1754 delivered a thesis, 'De Humore Acido a Cibus Orto et Magnesie Alba,' in which he ascribes the difference between the mild and caustic alkalies to the presence of fixed air (carbonic acid) in the former. The discovery of carbonic acid is of interest not only as having preceded the other gases made by Priestley, Cavendish, and others, but as having preceded in its method the explanation given by Lavoisier of the part played by oxygen in combustion. In 1756 he was appointed professor of medicine and lecturer on chemistry in the University at Glasgow; and in 1766 to the same chair in Edinburgh. No teacher inspired his disciples with such a zeal for study; his lectures, therefore, contributed much to make the taste for chemical science general in England. Upon Lavoisier's proposal, the Academy of Sciences in Paris appointed him one of its eight foreign members. Black did not adopt the Lavoisierian system until he was satisfied that it was more accurate than that of which he had been so long a teacher. In his later courses, however, he taught the anti-phlogistic system. His 'Lectures on Chemistry' appeared in 1803.

UNIVERSAL
LIBRARY



137 944

UNIVERSAL
LIBRARY

